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ROSWELL DISTRICT

WILDERNESS

DRAFT ENVIRONMENTAL ASSESSMENT

U.S. Department of the Interior
Bureau of Land Management
Roswell District
New Mexico
March 1983

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1983

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Roswell District Office
P.O. Box 1397
Roswell, New Mexico 88201

IN REPLY
REFER TO:

8520

TO ALL INTERESTED AGENCIES, OFFICIALS, PUBLIC GROUPS, AND INDIVIDUALS:

Enclosed is a copy of the Draft Environmental Assessment (EA) for two Wilderness Study Areas (WSA's) in the Bureau of Land Management's (BLM) Roswell District. Both of the WSA's, Carrizozo Lava Flow and Little Black Peak, are located in Lincoln County, New Mexico.

This Draft EA has been prepared as part of a statewide BLM wilderness study process. It is being released for public comment simultaneously with other EA's prepared for WSA's in the BLM District Offices of Albuquerque, Socorro, and Las Cruces, New Mexico.

This document provides the first opportunity for public comment on the initial wilderness suitability recommendation made by the Area Manager. This recommendation is subject to refinement or change by the District Manager in the Final EA, the BLM New Mexico State Director in the statewide Draft Environmental Impact Statement, (EIS), and the Secretary of the Interior in the Final EIS/Wilderness Study Report. During this portion of the wilderness study process, the Area Manager is asking for comments on his recommendation and alternatives. He is particularly interested in specific information about individual WSA's. Please submit your comments by May 31, 1983 to:

Phil Kirk
Area Manager
Roswell Resource Area
P. O. Box 1397
Roswell, NM 88201

Because of the number of WSA's involved throughout the state, a 60-day review is being provided. During this review you are encouraged to contact the Area Manager for additional information. Based upon the public comments, the recommendation made by the Area Manager will be reevaluated and are subject to my concurrence in the Final EA.

Sincerely yours,

Richard Bastin

Richard Bastin
Associate District Manager

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WILDERNESS
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CHAPTER 1

PURPOSE AND NEED

NEED FOR THE ACTION

The Federal Land Policy and Management Act (FLPMA) of 1976 mandated the Bureau of Land Management (BLM) to examine the wilderness potential of certain areas of public land. The wilderness review provision of FLPMA, Section 603, directs the BLM to conduct an inventory to identify all roadless areas of 5,000 acres or more that have wilderness characteristics. These areas are called Wilderness Study Areas (WSA's).

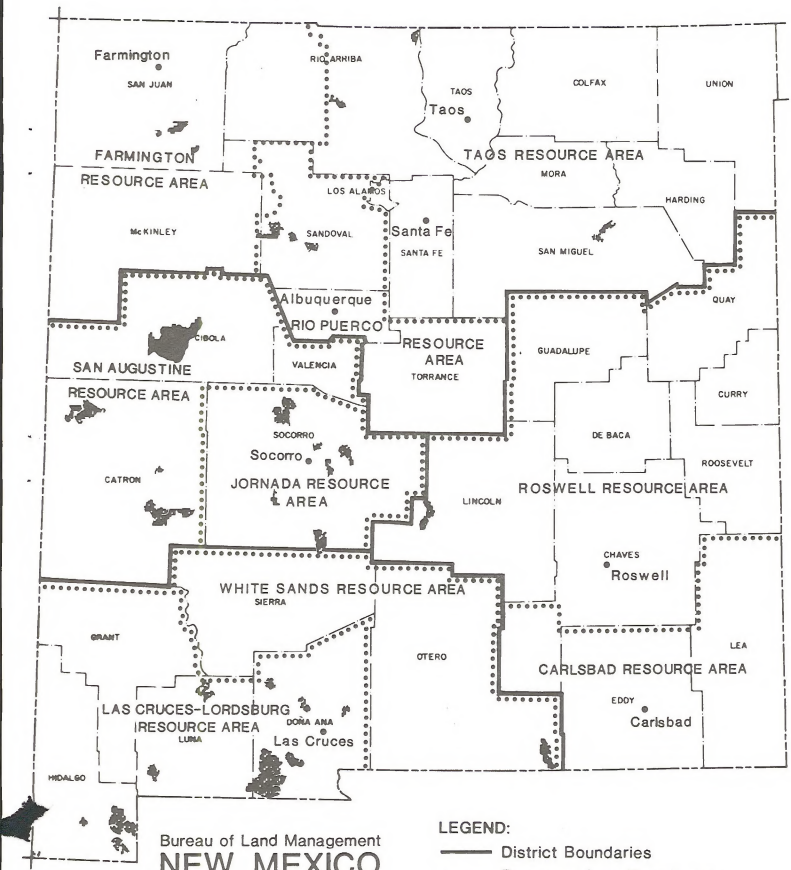
Once WSA's have been identified, they are studied through BLM's planning system to determine whether each is suitable for preservation as wilderness or is more suitable for other uses. The findings of these studies lead to recommendations, through the Secretary of the Interior and the President, to Congress. Only Congress has the authority to designate public land as wilderness.

THE BLM NEW MEXICO WILDERNESS STUDY PLANNING PROCESS

In New Mexico, 33 WSA's (see Map 1-1) are being studied simultaneously as part of a statewide planning process. In accordance with BLM planning regulations, a Category III plan amendment process is being followed. The process provides for site-specific analysis through preparation of district EA's. After the district EA's are finalized, a statewide Draft EIS will be prepared which will summarize cumulative impacts and include the recommendations of the BLM New Mexico State Director. These recommendations will be based upon the District and Area Managers' recommendations and any new information including public comment. Additionally, the State Director's recommendations will take into account an additional BLM Wilderness Study Criterion which requires consideration of representation of basic ecosystems in the National Wilderness Preservation System. After public comment and subsequent revisions, a Final EIS and Wilderness Study Report will be prepared. Recommendations will be made through the Secretary of the Interior to the President followed by Congressional action. These EA's, the statewide EIS, and subsequent decisions in conjunction with Congressional action will serve to amend current land use plans.

Through this wilderness study and planning process, the Roswell District will be amending one land use plan. The Roswell Resource Area plan will be amended by incorporating the Congressional decision on the Carrizozo Lava Flow and Little Black Peak WSA's.

This Draft EA summarizes impacts from a district-wide perspective for Little Black Peak and Carrizozo Lava Flow WSA's. Detailed discussions of these WSA's are included in the Wilderness Analysis Report located in Appendix 1. Due to the similarities and common boundary of the Carrizozo Lava Flow and Little Black Peak WSA's, these two areas are treated as one combined WSA throughout this EA.



Bureau of Land Management

NEW MEXICO WILDERNESS STUDY AREAS 1982

LEGEND:

- District Boundaries
- Resource Area Boundaries
- BLM Wilderness Study Areas

Map 1-1

WILDERNESS STUDY AREAS IN THE ROSWELL DISTRICT

The wilderness inventory process in the Roswell District resulted in the designation of two WSA's (see Map 1-2) in the Roswell Resource Area, which are:

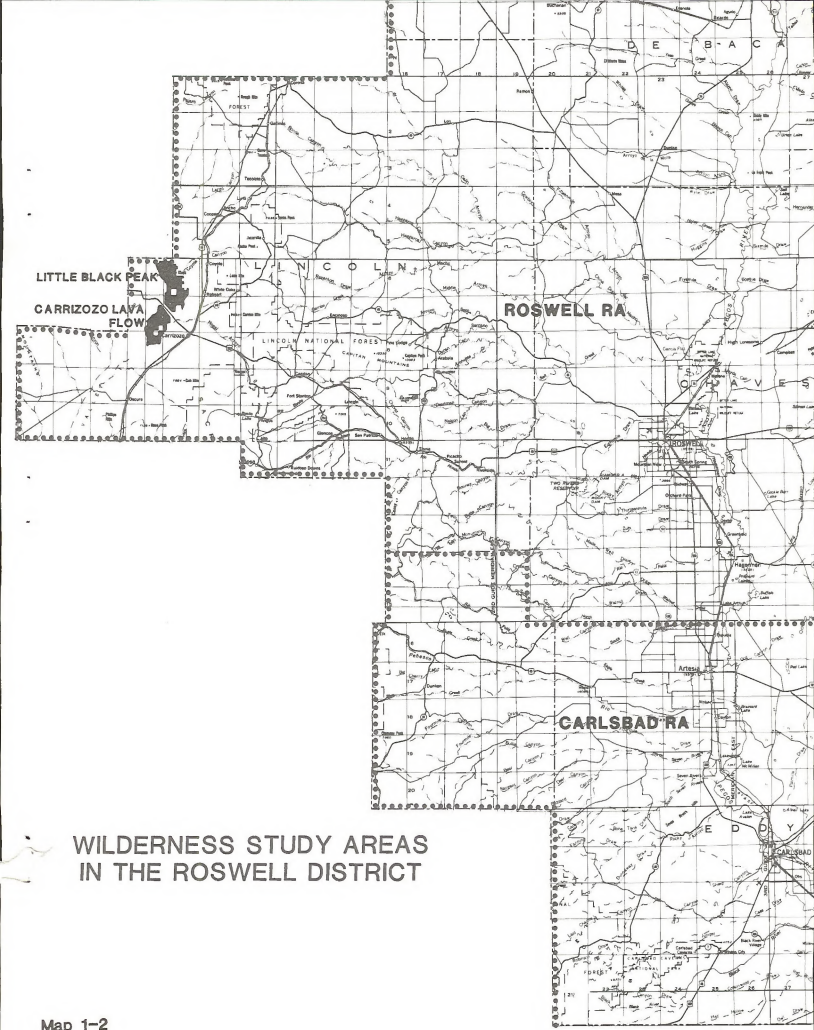
- Little Black Peak (NM-060-109) 15,072 acres
- Carrizozo Lava Flow (NM-060-110A-1) 10,240 acres

The above acreages are approximate and also reflect some corrections made during the wilderness study. Therefore, some of these acreages differ from the acreages published in the New Mexico Wilderness Study Area Decisions (1980).

On December 30, 1982 the Secretary of the Interior published a notice in the Federal Register that amended previous wilderness inventory decisions to ensure conformance with recent legal interpretations. In New Mexico these policy changes resulted in the elimination of 12 WSA's and boundary changes in 11 WSA's.

Four WSA's in the Carlsbad Resource Area of Roswell District were eliminated as a result of policy changes. Lonesome Ridge, McKittrick Canyon and Devil's Den Canyon WSA's were dropped because they were less than 5,000 acres. The Mudgetts WSA was dropped because it was less than 5,000 acres and did not possess mandatory wilderness characteristics, even though it was contiguous with the Carlsbad Caverns Wilderness Area.

Another policy change made by the Secretary of the Interior deleted split estate lands (federally owned surface/non-federally owned subsurface) from wilderness review. Although split estate did not occur in Roswell District WSA's, varying acreages of split estate were present in eleven WSA's in other BLM districts in New Mexico. In some WSA's the deletion of split estate lands caused significant boundary changes which caused BLM to restudy these areas in order to make wilderness suitability recommendations. Recommendations for these WSA's will be analyzed in a separate supplemental Draft Environmental Assessment which will be released for public review after the restudy has been completed.



WILDERNESS STUDY AREAS IN THE ROSWELL DISTRICT

Map 1-2

CHAPTER 2

ALTERNATIVES INCLUDING THE PREFERRED ALTERNATIVE

Three alternatives are evaluated for each WSA: All Wilderness, Amended Boundary (Partial Wilderness), and No Action (No Wilderness). These alternatives are summarized in Table 2-1 below.

The preferred alternative identified in Table 2-1 represents the recommendations of the Roswell Resource Area Manager for Carrizozo Lava Flow and Little Black Peak WSA's. See Appendix 1 for a more detailed discussion of the rationales for the preferred alternative.

TABLE 2-1

SUMMARY OF ALTERNATIVES

WSA/Acres	Preferred Alternative	All Wilderness	Amended Boundary (Partial Wilderness)	No Action (No Wilderness)
Little Black Peak/ Carrizozo Lava Flow 25,312 acres	Recommend 24,249 acres suitable for wilderness designation. Manage the remaining 1,063 acres under no special designation.	Recommend 25,312 acres suitable for wilderness designation.	Same as Preferred Alternative.	Recommend 25,312 acres unsuitable for wilderness designation. Manage entire acreage under no special designation.

CHAPTER 3

AFFECTED ENVIRONMENT

OVERVIEW OF THE ROSWELL DISTRICT

The Roswell District is located in southeastern New Mexico and is divided into two Resource Areas. The Roswell Resource Area administers nearly 1.8 million acres of public land, mostly in Lincoln and Chaves Counties, with some scattered public lands in De Baca, Guadalupe, Roosevelt, and Quay Counties. Little Black Peak Wilderness Study Area (WSA) and Carrizozo Lava Flow WSA are located in western Lincoln County. The Carlsbad Resource Area administers over 2 million acres of public land in Lea, Eddy, and southwestern Chaves Counties. No WSA's are located in the Carlsbad Resource Area.

Oil and gas production, potash mining, livestock grazing and recreation are the major uses of public lands in the Roswell District. These activities, along with other agricultural activities, also constitute the major uses on non-public lands in the area.

SOCIAL AND ECONOMIC CONDITIONS

Introduction

The primary social and economic effects of wilderness recommendations in the Roswell District are expected to be confined to Lincoln County, which comprises the immediate geographic and economic area that would interact with activities taking place in the WSA's.

Only very minor impacts would occur when they are considered in the context of a greater geographic area. These would be limited to impacts on social attitudes toward wilderness in the region and possibly in other parts of the nation.

Population and Economy

The population of Lincoln County is divided between rural areas and the incorporated areas of Ruidoso and Carrizozo. The rapid growth of Ruidoso is quickly moving the balance of population to the incorporated areas. Ranching continues to be important to the local economy of Lincoln County, but the recreation and tourism industry far surpasses it as the principal source of income and employment. Government and construction are also important employers in the county.

The per capita income for Lincoln County is below the state average. The unemployment rate for this county falls below the current state unemployment rate.

WILDERNESS STUDY AREAS

Tables 3-1 and 3-2 summarize the affected environment and the existing and potential uses of the WSA's.

TABLE 3-1

SUMMARY OF AFFECTED ENVIRONMENT

WSA	ACREAGE	LAND STATUS	TOPOGRAPHY	GEOLOGY	VEGETATION	WILDLIFE
LITTLE BLACK PEAK/ CARRIZOZO LAVA FLOW						
(1) Entire WSA	25,312	25,312 public acres 640 acres of state inholdings. (Not a part of WSA).	Volcanic cinder cone and rough lava field; limestone hills and level plains bordering lava flow.	Recent basalt flow and soils on top of sedimentary rock formations; small areas of exposed intrusive and sedimentary rocks.	25,312 acres of mixed shrubs, grasses and scattered juniper trees.	Mule deer, barbary sheep, melanistic races of small animals, raptors, valuable wildlife habitat.
			T & E SPECIES	CULTURAL	WILDERNESS VALUES	
			Temporary habitat for migratory raptors; moist sinkholes are habitat for one state plant of special concern.	Limited cultural values, consisting of scattered historical sites and seasonally occupied prehistoric sites.	High quality naturalness and solitude values and moderate quality recreation values in lava flow; moderate to low quality values in other parts of WSA's.	
	ACREAGE	LAND STATUS	TOPOGRAPHY	GEOLOGY	VEGETATION	WILDLIFE
(2) Portion Recommended Suitable	24,249	24,249 public acres. 640 acres of state inholdings (Not a part of WSA).	Same as entire WSA, except that most level plains and small area of lava and limestone hills are excluded from recommendation.	Same as entire WSA except that small portion of lava flow, most soil covered areas and some exposed sedimentary rocks excluded from recommendation.	24,249 acres of mixed shrubs, grasses, and scattered juniper trees.	Same as entire WSA.
			T & E SPECIES	CULTURAL	WILDERNESS VALUES	
			Same as entire WSA.	Same as entire WSA.	Same as entire WSA, except areas with moderate and low quality values are excluded.	
	ACREAGE	LAND STATUS	TOPOGRAPHY	GEOLOGY	VEGETATION	WILDLIFE
(3) Portion Recommended Unsuitable	1,063	1,063 public acres.	Level plains, limestone hills and small area of lava flow.	Small areas of exposed sedimentary rocks, soil covered areas and basalt flow.	1,063 acres of grasses and mixed shrubs; few trees.	Less wildlife and habitat diversity than descriptions (1) or (2).
			T & E SPECIES	CULTURAL	WILDERNESS VALUES	
			No significant habitat for migratory raptors and special concern plant.	No known cultural values.	Contains portions of WSA's with the lowest quality values.	

TABLE 3-2

EXISTING AND POTENTIAL USES

WSA	MINERALS	LIVESTOCK GRAZING	RECREATION	EDUCATION/RESEARCH	REALTY ACTIONS	WILDLIFE
LITTLE BLACK PEAK/ CARRIZOZO LAVA FLOW						
(1) Entire WSA	Low favorability for development of known and potential mineral occurrences.	WSA contains minor portions of four cattle allotments. No range developments are proposed. Potential use by goats. OTHER Military training use of airspace above WSA's.	Uses include hunting, hiking, bird watching, nature study and spelunking.	Study and interpretation of plants, animals and geologic processes.	Potential reconstruction of US Highway 380 inside of present right-of-way.	Recreation and education research uses. No special management or habitat improvement projects proposed.
(2) Portion Recommended Suitable	MINERALS Same as above. (Entire WSA)	LIVESTOCK GRAZING Same as above. OTHER Same as Entire WSA.	RECREATION Same as above.	EDUCATION/RESEARCH Same as above.	REALTY ACTIONS N/A	WILDLIFE Same as above.
(3) Portion Recommended Unsuitable	MINERALS Same as above.	LIVESTOCK GRAZING Same as above. OTHER Same as Entire WSA.	RECREATION Little recreational use; limited opportunities for uses described in "Entire WSA" (above).	EDUCATION/RESEARCH Limited research potential.	REALTY ACTIONS Potential expansion in width of highway and associated right-of-way.	WILDLIFE Same as above.

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

SUMMARY OF IMPACTS

Table 4-1 in this chapter presents a summary of environmental consequences described in the Wilderness Analysis Report located in Appendix 1. If these areas are designated as wilderness, a site-specific wilderness management plan will be prepared. This plan will provide the opportunity to incorporate measures designed to mitigate adverse environmental impacts, where feasible and reasonable measures exist. The environmental consequences described in this chapter were determined without considering potential impact reduction measures that could be included in a wilderness management plan.

SOCIAL AND ECONOMIC IMPACTS

None of the alternatives would have a significant impact on the population, economy, employment or social services in the Roswell District.

Wilderness designation may enhance the preservation value of the wilderness. The preservation value of wilderness includes option, existence, and bequest values of the general public. The option value is defined as the willingness to pay for the opportunity to have access to wilderness areas for recreation use in the future. The existence value is defined as the amount of money people are willing to pay for the knowledge that natural habitat for plants, fish, and wildlife are protected in wilderness areas. The bequest value is defined as the willingness to pay for the satisfaction derived from endowing future generations with wilderness resources (Walsh et al., 1981). Quantification of these values is beyond the scope of this document.

Minor inconveniences to livestock operations may result due to the restriction on vehicular access as a result of wilderness designation. However, most of the current vehicle use by ranchers takes place on roads outside the WSA's.

Under wilderness designation and management, oil and gas leases that are not grandfathered could not be developed. A "grandfathered" lease is one acquired prior to the Federal Land Policy and Management Act of 1976. There are no grandfathered leases in both WSA's since all leases were issued after September 1980.

Wilderness designation would not change the general attitudes of local residents. Ranchers have expressed concern that wilderness would limit their abilities to conduct their operations. Representatives from the mineral industry have stated that wilderness designation may permanently lock up energy or mineral resources that are critical to the nation. On a regional or statewide level, members of the public have expressed the belief that wilderness designation enhances management of scenic and natural values, as well as recreational opportunities.

TABLE 4-1

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

ALTERNATIVES BY WSA	ACREAGE	MINERALS	VEGETATION	LIVESTOCK GRAZING	RECREATION
LITTLE BLACK PEAK/ CARRIZOZO LAVA FLOW					
All Wilderness	25,312	Low degree of impact upon all mineral uses due to low potentials for development.	No significant impact to water and soil. Restrictions on surface disturbance and potential grazing would protect vegetation.	No impact to existing use. Potential grazing would be managed to maintain vegetative diversity and other wilderness values.	Increased levels of visitor use. Prohibition of motorized activities in accessible terrain.
Amended Boundary	24,249	Mineral uses could be allowed on lands excluded from alternative.	Same as all wilderness except vegetation would be protected on a slightly smaller area.	Same as all wilderness except slightly smaller area affected.	Same as all wilderness except motorized use on most existing vehicle routes and level terrain could take place.
No Action	25,312	Resource use could increase slightly over the long term, due to low potentials and accessibility problems.	Surface disturbance would have localized effect, and livestock grazing could alter vegetative diversity.	No significant impacts.	Primitive recreation opportunities are expected to be available in most of the area. Motorized activities would not be impacted.

	EDUCATION/RESEARCH	REALTY ACTIONS	WILDLIFE	VISUAL	WILDERNESS VALUES
All Wilderness (cont.)	Protection of natural ecosystem would insure long-term availability of education/research values.	Expansion of US Hwy 380 would be precluded.	Maximum amount of habitat would be protected.	Long-term protection of existing resources.	Wilderness values would receive long-term Congressional protection.
Amended Boundary (cont.)	Areas having highest values would be protected.	No significant impacts.	Undisturbed habitat in lava flow would be protected. Highway fence construction could affect movement of big game species.	Area with highest scenic quality would be protected.	Lands with highest quality wilderness values would be protected.
No Action (cont.)	Disturbance of natural vegetation would impair research values. Long-term availability of values would not be ensured. No significant effect upon zoological research values.	No significant impacts.	Minor long-term impact to habitat in areas where disturbance occurs. Fence construction impacts could also occur.	Visual resources would be afforded less stringent protection.	Wilderness values would be impaired or lost along the lava flow periphery and other areas where surface disturbance occurs. Rugged terrain would prevent impacts in most of the area.

CHAPTER 5

CONSULTATION AND COORDINATION

PURPOSE OF SCOPING

The Council on Environmental Quality Regulations implementing the procedural provisions of the National Environmental Policy Act and the BLM planning regulations provide for an early and open process to determine the scope of issues to be addressed and to identify the significant issues related to the proposed alternatives. This process is termed "scoping." In addition, the lead agency is required to inform and involve affected Federal, State, and local agencies, Indian tribes and other interested persons. The process is designed to identify and emphasize the significant issues and eliminate from detailed consideration those that are either not significant or have been covered by earlier environmental review. This process results in a more concise document.

SCOPING ACTIVITIES

During the study phase of the wilderness review process, various Federal, State, and local agencies, interest groups and individuals were contacted. These contacts were made to inform the public about the wilderness study process and to gather resource information and identify significant issues from the public to incorporate into the Wilderness Analysis Report (WAR).

Scoping activities for this statewide wilderness study in New Mexico were a combined effort by BLM state, district and resource area offices. The scoping process started in mid-January 1982 with the issuance of news releases and a Federal Register notice by the BLM State Office in Santa Fe. Scoping activities at the district and resource area office levels started in late January and early February 1982. The Roswell Area Manager contacted various governmental agencies by letter and requested information concerning plans or policies that would be relevant to the study of specific Wilderness Study Areas (WSA's). In late April, the Roswell District Manager sent letters to over 300 agencies, groups and individuals that had previously received mailings during the district wilderness inventory process. Those contacts were invited to participate in the wilderness study and notified about pending open house meetings in Roswell, Carlsbad and Carrizozo, New Mexico. Twenty-two people subsequently attended the series of open house meetings to voice their concerns or request additional information about the study process. The most recent consultation activity consisted of a briefing session held at Roswell for New Mexico Congressional delegation representatives in October 1982.

Records concerning consultation, coordination, scoping activities and public involvement efforts are on file at the Roswell District Office.

The intensity of public interest in Roswell District study efforts has been relatively meager, when compared with the extent of involvement expressed in other New Mexico BLM districts. Several public comments received during the scoping and study processes were very general in that they stated a preference only for more or less designated wilderness. Additional consultation and coordination will take place during the public review period for this Draft Environmental Assessment (EA), and during later stages of the statewide wilderness study.

A mailing list has been assembled and continuously updated throughout the study process. Copies of this Draft EA or other summary information will be sent to all parties that have expressed an interest in the study of Roswell District WSA's.

LIST OF PREPARERS

A list of persons involved in the preparation of the WAR and EA is provided in Table 5-1.

TABLE 5-1
LIST OF PREPARERS

NAME	EA/WAR CONTRIBUTIONS	EDUCATION	YEARS OF EXPERIENCE
Mike Bunker	Team Leader (Roswell WAR); Visual resources, minerals, education/ research, realty, wilderness values, EA preparation.	B.S., Forestry	13.5
Mike Howard	Vegetation, livestock grazing	B.S., M.S. Wildlife Management	3.5
Joe Hummel	Recreation, education/ research, realty	B.S., Natural Resources	7
Allan Lemley	Geology, minerals	B.S., Geology	1
Carol McDonald	EA preparation, environmental coordination	B.A., M.A., English	6.5
Linda Rundell	Wildlife, cultural resources	B.S., Wildlife Management	4
Clarence Seagraves	Soil, water, air	B.S., Agronomy	10.5

SUPPORT PERSONNEL (Roswell District)	
Angie Medina	Typist
Marce' Scott	Typist
Sherry Spurrier	Typist

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John Gregg	District Manager, Roswell
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Roy Stovall	Chief of Operations, Roswell
Hans Stuart	Public Information Specialist, Roswell
Joe Sovcik	Environmental Coordinator, Santa Fe
Hank Wilson	Geologist, Santa Fe
Dan Wood	Wilderness Specialist, Santa Fe

GLOSSARY

ADIT. A nearly horizontal entrance to a mine.

AGGREGATE. A mineral material such as sand, gravel, shells, or broken stone.

ALLOTMENT. An area of land designated and managed for grazing of livestock.

ALLOTMENT MANAGEMENT PLAN (AMP). A documented program which applies to rangeland operations on public land, which is prepared in consultation with the permittee(s) or lessee(s) involved, and which: (1) prescribes the manner in and extent to which livestock operations will be conducted in order to meet the multiple-use, sustained-yield, economic, and other needs and objectives as determined for public land through land use planning; (2) describes the type, location, ownership, and general specifications for the rangeland developments to be installed and maintained on public land to meet the livestock grazing and other objectives of land management; and (3) contains such other provisions relating to livestock grazing and other objectives as may be prescribed by the authorized officer consistent with applicable law.

ALLUVIAL. Pertaining to alluvium; deposited by a stream or running water.

ALLUVIAL CONE. An alluvial fan with steep slopes.

ALLUVIUM. A general term for clay, silt, sand, gravel, or similar unconsolidated sediments deposited by a stream or other body of running water.

ANDESITE. A volcanic rock composed essentially of andesine and one or more mafic constituents. The mafic constituents may be pyroxene, hornblende, or biotite.

ANIMAL-UNIT MONTH (AUM). The amount of forage consumed by one mature cow (1,000 lb.) or its equivalent for one month.

ANTICLINE. An upfold of stratified rock in which the beds bend downward in opposite directions from the crest.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN (ACEC). Areas within the public land where special management attention is needed to protect and prevent irreparable damage to important historical, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards.

ARKOSE. A sandstone containing 25 percent or more of feldspars, usually derived from silicic igneous rocks.

ASPECT SPECIES. A vegetative species that appears to be dominant in the landscape, although it may be only a small percent of the total vegetative composition.

AVIFAUNA. All birds of a given region.

BASALT. A dark to medium-dark colored commonly extrusive mafic igneous rock.

BASIN AND RANGE PHYSIOGRAPHIC PROVINCE. A province in the southwestern United States characterized by a series of tilted fault blocks forming longitudinal ridges or mountains and broad intervening basins.

BATHOLITH. A great mass of intruded igneous rock that extends downward to unknown depth.

BOLSONS. A flat-floored desert valley that drains to a playa.

BUREAU SENSITIVE. Fish, wildlife, and plants which are candidates for Federal listing or species proposed for Federal listing automatically become Bureau Sensitive species.

CALDERA. A large basin-shaped volcanic depression the diameter of which is much greater than the vent.

CARBONACEOUS. 1. Coaly. 2. Pertaining to, or composed largely of, carbon. 3. The carbonaceous sediments include original organic tissues and subsequently produced derivatives of which the composition is chemically organized.

CAULDRON. An inclusive term for all volcanic subsidence structures regardless of shape or size.

CHERRY-STEMMED. An unofficial term used to describe the way an inventory unit boundary is drawn to exclude a road that enters the unit; the resulting boundary resembles a cherry-stem.

CLOSED BASIN. A basin is considered closed with respect to surface flow if its topography prevents the occurrence of visible outflow. It is closed hydrologically if neither surface nor underground outflow can occur.

CONFORMABLE. 1. Strata or groups of strata lying one above another in parallel order are said to be conformable. 2. When beds or strata lie upon one another in unbroken and parallel order, and this arrangement shows that no disturbance or denudation has taken place at the locality while their deposition was going on, they are said to be conformable.

CONGLOMERATES. Clastic sedimentary rock composed of rounded fragments varying from small pebbles to large boulders in a cement of calcareous material such as iron oxide, silica, or hardened clay.

CONTIGUOUS LANDS. As it pertains to Wilderness, lands or legal subdivisions having a common boundary. Lands having only a common corner are not contiguous.

COPPICE DUNES. Sand dunes stabilized around shrubs.

CRITICAL MINERALS. Those minerals that are critical to the economy and security of the Unites States and for which we are now dependent on unreliable foreign sources. These minerals are listed in the National Defense Stockpile Inventory of Strategic and Critical Materials.

CUESTAS. A hill or ridge with a steep face on one side and a gentle slope on the other.

DEFORMATION. Any change in the original form or volume of rock masses produced by tectonic forces; folding, faulting, and solid flow are common modes of deformation.

DIKE. A tabular body of igneous rock that cuts across the structure of adjacent rocks or cuts massive rocks.

DIRT TANK. Usually a permanent earthen structure for holding water temporarily. These are built in high rainfall runoff areas such as an arroyo, canyon, or swale area.

DRAINAGE BASIN. A part of the surface of the earth that is occupied by a drainage system, which consists of a surface stream or a body of impounded surface water together with all tributary surface streams and bodies of impounded water.

ECOSYSTEM. An ecological community considered together with the nonliving factors of its environment as a unit.

ECOTONE. A transition area between plant communities which has some of the characteristics of each.

EMBAYMENT. Term describing a continental border area that has sagged concurrently with deposition so that an unusually thick section of sediment results. An embayment is similar to a basin of sedimentation of a geosyncline, and some embayments may be one flank of a larger subsiding feature.

ENDANGERED SPECIES.

Federally listed - Any species of animal or plant in danger of extinction throughout all or a significant portion of its range.

State (Group I) - Species whose prospect of survival or recruitment in the state are in jeopardy in the foreseeable future.

State (Group II) - Species whose prospect of survival or recruitment within the state may become jeopardized in the foreseeable future.

EPHEMERAL STREAMS. A stream or portion of a stream which flows only in direct response to precipitation. Such flow is usually of short duration.

EROSION CONTROL STRUCTURES. Usually one large earthen, rock, wire, cement, etc. structure used to hold large concentrated flows of water and release this water in small non-eroding amounts.

EXTENSION AREA. A test range in excess of that provided by the main White Sands Missile Range (WSMR) required for an indefinite period of time to support future military programs.

EXTRUSIVE ROCK. Rocks derived from magma poured out or ejected at the earth's surface.

FAULT. A fracture in the earth's crust accompanied by a displacement of one side with respect to the other.

FAULT BLOCK. A block of the earth's crust bounded on at least two opposite sides by faults; it may be elevated or depressed relatively to the adjoining region.

FAULT SCARP. The cliff formed by a fault. Most fault scarps have been modified by erosion since the faulting.

FISSURE. 1. An extensive crack, break, or fracture in the rocks. A mere joint or crack persisting only for a few inches or a few feet is not usually termed a fissure by geologists or miners, although in a strict physical sense, it is one. 2. Where there are well-defined boundaries, very slight evidence of ore within such boundaries is sufficient to prove the existence of a lode. Such boundaries constitute the sides of a fissure.

FLPMA. Federal Land Policy and Management Act of 1976, which mandated the BLM Wilderness Review. Often referred to and pronounced "FLIPMA".

FOLD, FLEXURE. A type of fold, in size microscopic to orogenic, in which movement took place normal to the axial line and parallel with the limbs, producing notable shortening.

FORMATION. The primary unit of formal mapping or description. Most formations possess certain distinctive or combinations of distinctive lithic features. Boundaries are not based on time criteria. Formations may be combined into groups or subdivided into members.

GANGUE. The nonvaluable minerals in ore.

GEOPHYSICAL EXPLORATION. The use of geophysical instruments and methods to determine subsurface conditions by analysis of such properties as specific gravity, electrical conductivity, or magnetic susceptibility. This usually has an economic objective, e.g. discovery of fuel or mineral deposits.

GEOTHERMOMETRY. Measurement and study of the earth's heat, usually measured through shallow temperature gradient holes less than 500 feet.

GRABEN. A block generally long compared to its width that has been down thrown along faults relative to the rocks on either side.

GRANDFATHERED. Section 603(c) of FLPMA directs the BLM to manage lands under wilderness review "so as not to impair the suitability of such areas for preservation as wilderness..." However, Section 603(c) also provides a special exception to the "nonimpairment" criteria. Mining, grazing, and mineral leasing uses existing on the date of approval of FLPMA (October 21, 1976) may continue in the same manner and degree as on that date even if these uses impair wilderness values. Such uses are "grandfathered".

HEAT FLOW. Dissipation of heat coming from within the earth by conduction or radiation at the surface; average about 1.2x10-6 cal./cm.2/sec.

HORST. A block of the earth's crust separated by faults from adjacent blocks that have been relatively depressed.

HYDROCARBONS. Any organic compound, gaseous liquid or solid, consisting solely of carbon and hydrogen such as crude oil.

HYDROTHERMAL. Relating to hot water in the formation of minerals by the action of hot solutions rising up through the earth's crust from a cooling magma.

IGNEOUS ROCKS. Rocks formed by solidification of magma.

INHOLDING. Private or state owned land inside the boundary of a wilderness study area but excluded from the wilderness study area.

INITIAL INVENTORY. The first step in the BLM Wilderness Review Process. Inventory units or roadless areas which are obviously unsuitable for wilderness are separated from those which warrant intensive inventory for wilderness characteristics.

INSTANT STUDY AREAS. Section 603 of the Federal Land Policy and Management Act mandated that all primitive or natural areas formally identified prior to November 1, 1975, will be studied for wilderness suitability and recommended to the President by July 1, 1980. There are three such areas in New Mexico.

INTENSIVE INVENTORY. The second major step in the BLM Wilderness Review Process. Roadless areas are carefully inventoried for wilderness characteristics. The result of the intensive inventory is the identification of wilderness study areas.

INTERIOR FENCE. Fences used to divide allotments into pastures or holding areas.

INTRUSION. A feature (land and water form, vegetation, or structure) which is generally considered out of context because of excessive contrast and disharmony with characteristic landscape.

INTRUSIVE ROCK. A rock that consolidated from magma beneath the surface of the earth.

INVENTORY UNIT. Areas or islands of public land indexed for easy reference at the start of the wilderness inventory. These units may or may not be roadless. A roadless determination requires more detailed field work.

LIFE ZONE. Any series of biogeographic zones into which a continent, region, etc., is divided by latitude and altitude on the basis of the characteristic animal and plant life in a zone.

LITHIC. A stone or rock exhibiting modification by humans. It generally applies to projectile points, scrapers, chips, etc., rather than ground stone.

MAGMA. Naturally occurring mobile rock material, generated within the earth and capable of intrusion and extrusion, from which igneous rocks are thought to have been derived through solidification and related processes.

MAGNETIC PROSPECTING/GRAVITY SURVEYS. A technique of applied geophysics; a survey using a magnometer or a gravity meter on the ground or from the air to measure variations in magnetic or gravitational intensity.

MALPAIS. Rough country composed of dark basaltic lava.

MANAGEMENT FRAMEWORK PLAN (MFP). A planning decision document that establishes, for a given planning area, land use allocations, coordination guidelines for multiple use, and management objectives to be achieved for each class of land use or protection. BLM's land use plan. An MFP is prepared in three steps: (1) resource recommendations, (2) impact analysis and alternative development, and (3) decision making.

METAMORPHIC ROCKS. Rocks formed in the solid state in response to changes of temperature, pressure, and chemical environment.

METAMORPHISM. Process by which consolidated rocks are altered in composition, texture, or internal structure by conditions and forces not resulting simply from burial and the weight of subsequently accumulated overburden.

METAVOLCANICS. Partly metamorphosed volcanic rocks.

MINERALIZATION. The process of converting or being converted into a mineral, as a metal into an oxide, sulfide, etc.

OFF-ROAD VEHICLE (ORV). Any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other terrain.

OVERSTORY. The upper canopy(s) of plants.

PALEOENVIRONMENTAL STUDIES. Studies using fossilized pollen and other geological and biological remains to determine past climatic conditions.

PARTHENOGENIC. Unisexual reproduction where offspring are produced from unfertilized eggs.

PEDIMENT. A broad gentle sloping bedrock surface that is situated at the foot of a much steeper mountain slope in an an arid or semi-arid region.

PERIPHERAL SPECIES. Species whose normal range is in adjoining states or Mexico and which are at the edge of their range in New Mexico.

PETROGLYPH. A form of rock art manufactured by incising, scratching, or pecking designs into rock surfaces.

PLACER. A place where gold is obtained by washing; an alluvial or glacial deposit, as of sand or gravel, containing particles of gold or other valuable minerals.

PLATFORM. The area of thinner sediments adjoining a geosynclinal wedge of thicker equivalent beds or a basin of thicker equivalent sediments.

PLAYA. The usually dry and nearly level lake plain that occupies the lowest parts of closed depressions.

PLUGS. Volcanic necks consisting of a mass of solidified igneous rock.

PLUTON. In the strictest sense, a body of igneous rock that has formed beneath the surface of the earth by consolidation from magma.

PROVINCE. A large area or region unified in some way and considered as a whole.

PSEUDORIPARIAN AREAS. Intermittent drainages (arroyos) supporting a more varied vegetative composition than the surrounding upland areas.

PSILOMELANE. An ore of manganese.

PUBLIC LAND. Any land and interest in land owned by the United States and administered by the Secretary of the Interior through the Bureau of Land Management, without regard to how the United States acquired ownership, except:

-- lands located on the Outer Continental Shelf

-- lands held for the benefit of Indians, Aleuts, and Eskimos

-- lands in which the United States retains the minerals, but surface is private.

PUMICE. An excessively cellular, glassy lava, generally of the composition of rhyolite.

PYROLUSITE. The principal ore of manganese.

PYROXENE. A group of dark, rock-forming silicate minerals.

RANGE SITE. Is a distinctive kind of rangeland that differs from other kinds of rangeland in its ability to produce a characteristic natural plant community. A range site is the product of all the environmental factors responsible for its development. It is capable of supporting a native plant community typified by an association of species that differs from that of other range sites in the kind or proportion of species or in total production (SCS 1976).

RANGELAND DEVELOPMENT. Any facility or structure relating to rangelands which is designed to control patterns of use, provide water, and stabilize soil and water conditions.

RAPTORS. Any predatory bird such as a falcon hawk, eagle, or owl that has feet with sharp talons or claws adapted for seizing prey and a hooked beak for tearing flesh.

RARE II. The wilderness inventory on lands administered by the Secretary of Agriculture through the United States Forest Service. The acronym stands for Roadless Area Review and Evaluation, and the "II" signifies that it is the second time the Forest Service has inventoried and evaluated the lands it administers.

RED BEDS. Term applied to red sedimentary rocks which usually are sandstones and shales, though in exceptional cases red limestones have been reported.

RHYOLITE. The extrusive equivalent of granite.

RIFT. Commonly refers to an elongated valley formed by tensional forces beneath the earth's crust.

RIGHT-OF-WAY. An easement or permit which authorizes public land to be used for a specified purpose that generally requires a long narrow strip of land; examples are roads, powerlines, pipelines, etc.

IPARIAN VEGETATION. Vegetation which occurs in or adjacent to essentially perennial drainage ways or their floodplains.

ROAD. For the purposes of the BLM's wilderness inventory, the following definition has been adopted from the legislative history of FLPMA:

"The word 'roadless' refers to the absence of roads which have been improved and maintained by mechanical means to ensure relatively regular and continuous use. A trail maintained solely by the passage of vehicles does not constitute a road."

To clarify this definition, the following subdefinitions also apply:

"Improved and maintained" - Actions taken physically by man to keep a road open to vehicular traffic. "Improved" does not necessarily mean formal construction. "Maintained" does not necessarily mean annual maintenance.

"Mechanical means" - Use of hand or power machinery or tools.

"Relatively regular and continuous use" - Vehicular use which has occurred and will continue to occur on a relatively regular basis. Examples are: access roads for equipment to maintain a stock water tank or other established water sources, access roads to maintained recreation sites or facilities, or access roads to mining claims.

ROADLESS. Refers to the absence of roads which have been improved and maintained by mechanical means to ensure relatively regular and continuous use. A trail maintained solely by the passage of vehicles does not constitute a road.

ROADLESS AREA. That area which is roadless, as defined above, and is bounded by a road, the edge of a right-of-way, other land ownership, or a significant imprint of man.

SEDIMENTARY ROCKS. Rocks formed by the accumulation of sediment.

SHEAR ZONE. A geologic zone in which shearing has occurred on a large scale so that the rock is crushed and brecciated.

SILICEOUS; SILICIOUS. Of or pertaining to silica; containing silica, or partaking of its nature. Containing abundant quartz.

SILL. A tabular igneous intrusion that parallels the planar structure of the surrounding rock.

SPECIAL CONCERN ELEMENT. Plant species considered rare or endangered by the New Mexico State Heritage Program, but not legislatively protected.

SPLIT ESTATE. Refers to the situation where the subsurface mineral estate is owned or controlled by a party other than the owner of the surface of the same land area.

SOLITUDE. Outstanding opportunities for solitude or primitive and unconfined recreation are wilderness characteristics examined in the intensive wilderness inventory. Factors contributing to opportunities for solitude are vegetative screening, topographic relief, vistas, and physiographic variety. 1. The state of being alone or remote from habitations; isolation. 2. A lonely, unfrequented, or secluded place.

STANDARD METROPOLITAN STATISTICAL AREA (SMSA). A metropolitan area that has a large population nucleus together with adjacent communities which have a high degree of economic and social integration with that nucleus. Each SMSA has one or more central counties containing the area's main population concentration; an urbanized area with at least 50,000 inhabitants.

STEPPE. Arid land usually characterized as being level and without forests; usually in large tracts and in regions of extreme temperature range and loess soil.

STORAGE TANK. A permanent water holding structure used to supply water to troughs, pipelines, etc.

STRATIFORM. Composed of layers.

STRINGER. A narrow vein or irregular filament of mineral occurring in a rock.

SULFIDE. A compound of sulfur with one other more positive element or radical.

SUPERGENE. Applied to ores or ore minerals that have been formed by generally descending water. Ores or minerals formed by downward enrichment.

SUPPLEMENTAL VALUES. Features of ecological, geological, or other scientific, educational, scenic, or historical value that may be present in an inventory unit. These are not necessary criteria for wilderness suitability, as is stated in the Wilderness Act of 1964, but must be assessed during the intensive wilderness inventory.

SUSTAINED YIELD. Management of a biological resource (as timber) such that the portion removed by one harvest is replaced by growth or reproduction before another harvest occurs.

SYNCLINE. A trough of stratified rock in which the beds dip toward each other from either side.

TECTONIC. Relating to the deformation of the earth's crust.

THREATENED SPECIES. Any species likely to become endangered within the forseeable future throughout all or a significant part of its range.

TRAVERTINE. Calcium carbonate deposits commonly associated with hot springs.

TROUGH. An elongate and wide depression with gently sloping borders.

TUFF. A compacted deposit of volcanic ash and dust that may contain sand and clay.

UNALLOTTED FEDERAL LANDS. Federal lands which currently are not committed to livestock grazing use.

UNCONFORMABLE. Having the relation of unconformity to the underlying rocks; not succeeding the underlying strata in immediate order of age and in parallel position.

UNDERSTORY. The plants growing beneath the canopy of other plants.

UPLIFT. Elevation of any extensive part of the earth's surface relative to some other parts.

VEHICLE TRAIL. A two-wheel track created only by the passage of vehicles. A trail is not a road.

VEIN. A tubular body, long in two dimensions and short in the third. An occurrence of ore minerals, usually disseminated throughout gangue, or veinstone.

VESICULAR BASALT. Basalt with abundant vesicles formed as a result of the expansion of gases during the fluid stage of lava.

VISUAL RESOURCE MANAGEMENT (VRM) CLASSES.

ACEC - The ACEC for scenic values consists of a landscape with high scenic values of relative scarcity. Management of the area will protect the visual quality of the landscape.

CLASS II - Changes in any of the basic elements (form, line, color, texture) caused by a management activity should not be evident in the landscape. A contrast may be seen but should not attract attention.

CLASS III - Contrasts to the basic elements caused by a management activity may be evident and begin to attract attention in the landscape. The changes, however, should remain subordinate in the existing landscape.

CLASS IV - Contrasts may attract attention and be a dominant feature in the landscape in terms of scale. However, the changes should repeat the basic elements of the landscape.

WATER SPREADER. Usually several small, earthen, rock structures used to slow the water flow and give the runoff a chance to be absorbed by the soils and plants.

WILDERNESS. The definition contained in Section 2(c) of the Wilderness Act of 1964 is as follows: "A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are

untrammeled by man, where man himself is a visitor who does not remain. Wilderness is an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features or scientific, educational, scenic, or historical value.

WILDERNESS AREA. An area formally designated by Congress as part of the National Wilderness Preservation System.

WILDERNESS CHARACTERISTICS. Those characteristics of wilderness as described in Section 2(c) of the Wilderness Act. These include size, naturalness, solitude, primitive and unconfined type of recreation, and supplemental values.

WILDERNESS INVENTORY. An evaluation of the public land in the form of a written description and a map showing those lands that meet the wilderness criteria as established under Section 603(a) of FLPMA and Section 2(c) of the Wilderness Act. The lands meeting the criteria will be referred to as Wilderness Study Areas (WSAs). Those lands identified as not meeting wilderness criteria will be released from further wilderness consideration.

WILDERNESS REVIEW. The term used to cover the entire wilderness inventory, study, and reporting phases of the wilderness program of the BLM.

WILDERNESS STUDY. The process of analyzing and planning wilderness preservation opportunities along with other resource opportunities within the BLM's planning system.

WITHDRAWAL. An action that restricts the use of public land and segregates the land from some or all of the public land or mineral laws.

ZEOLITES. A large group of minerals that are characterized by their easy and reversible loss of water. They are used in the base exchange method of water softening and as gas absorbents or drying agents (filters).

REFERENCES

U.S. Department of the Interior, Bureau of Land Management. November 1980. New Mexico Wilderness Study Area Decisions. Santa Fe, New Mexico.

Walsh, Richard G., Gillman, Richard B., and Loomis, John B., 1981. Wilderness Resource Economics: Recreation Use and Preservation Values. Department of Economics, Colorado State University, Fort Collins, Colorado.

APPENDIX 1

WILDERNESS ANALYSIS REPORT

LITTLE BLACK PEAK WILDERNESS STUDY AREA

NM-060-109

and

CARRIZOZO LAVA FLOW WILDERNESS STUDY AREA

NM-060-110A-1

ROSWELL DISTRICT

ROSWELL RESOURCE AREA

BUREAU OF LAND MANAGEMENT

October 1982

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This report was prepared to describe the resources, human uses and resource conflicts that were analyzed by the Bureau of Land Management (BLM) in order to develop management recommendations for two Wilderness Study Area's (WSA's). The two WSA's were previously identified during BLM's wilderness inventory process as Little Black Peak WSA and Carrizozo Lava Flow WSA. Normally, a single report is prepared for each WSA - however, due to the similarities and common boundary of these two areas a combined report was prepared to minimize repetitive narratives. Any differences between the WSA's are described in subsequent sections of this report. If no distinction between areas is made in a narrative it can be assumed to apply to both WSA's.

I. GENERAL DESCRIPTION

A. Location

Little Black Peak and Carrizozo Lava Flow WSA are located in the northeast arm of the Tularosa Basin near the western border of Lincoln County, New Mexico. These WSA's are administered by the Roswell Resource Area of Roswell District, Bureau of Land Management.

The WSA's consist of about the northern third of the Carrizozo "Malpais" (a Spanish word meaning "badlands") - an extensive lava flow on the valley floor west of Carrizozo, New Mexico. This lava flow originated from fissures near Little Black Peak cinder cone, a prominent geographic feature for which the northern WSA was named.

LITTLE BLACK PEAK, AN 85-FOOT HIGH CINDER CONE, MARKS THE SPOT WHERE THE CARRIZOZO MALPAIS ORIGINATED.

South of U.S. Highway 380, which forms a common boundary between the study areas, the Carrizozo Lava Flow WSA extends southwesterly for about 7 miles. The total length of the lava flow is about 44 miles of which 14 miles are under consideration for potential wilderness designation. The WSA's are located on three 15 minute series topographic maps published by the U.S. Geological Survey; Carrizozo, Chihuahua Ranch and Little Black Peak. WSA boundaries and their approximate location in southcentral New Mexico are shown on the map included at the end of this chapter.

B. Climate and Topography

Climate

The portions of the Carrizozo Malpais that are being evaluated for wilderness suitability are influenced by a considerable variation in precipitation. The northern end of the flow receives about 14 inches of precipitation contrasted with about 11 inches at the south end. The decline in precipitation is gradual within the 14 mile horizontal distance of both WSA's. This difference in precipitation between the northern and southern ends of the WSA's is believed to be due to a 700 foot reduction in elevation, and due to the "rain shadow" effect of the nearby Oscura Uplift which blocks the movement of moisture laden clouds to the southern part of the WSA's.

The arid climate of the WSA's is characterized by a hot summer season (90 to 95 degrees F. in July) during which most of the annual precipitation is received as rainfall. The average growing season is 190 days and prevailing winds are from the west or southwest. Winter temperatures are moderate with an average minimum temperature of 24° F. in January.

Topography

Elevations within the WSA's range from 5676 feet at Little Black Peak near the northern end of the lava flow to about 4000 feet at the southern boundary of the Carrizozo Lava Flow WSA. Topography and land form of the lava flow was strongly influenced by the southerly trending gradient of the valley floor. The flow appears to be relatively level when viewed from a distance. However, the surface of the flow is extremely rough and broken due to the presence of fractures, collapsed lava tubes and pressure ridges. There are no major water drainages within the lava flow since external water courses either disappear under or flow along the lava's edge for short distances. A low range of limestone hills are located on the western edge of the Carrizozo WSA.

C. Land Status

Based on acreage calculations derived from Bureau land status records, Little Black Peak WSA contains 15,072 acres under federal

surface and subsurface ownership. There is one non-federally owned inholding of 640 acres of New Mexico state trust land (surface and subsurface) located inside the WSA boundary.

Carrizozo Lava Flow WSA contains 10,240 acres, surface and subsurface federal ownership. There are no inholdings within this area since the WSA boundary conforms with property lines and manmade intrusions located on federal lands.

The boundary lines and land status for both WSA's are depicted on Map 1 at the end of this chapter. WSA boundaries were established during the inventory phase of BLM's wilderness review program which was completed in November 1980. WSA acreages used in this report are more precise than previous computations, and therefore are different than previously published acreage figures.

D. Access

Both WSA's are physically and legally accessible by overland foot travel from U.S. 380 along their common boundary. Permanent legal access for vehicles is not available from other locations since there are no public roads that enter the WSA. However, temporary legal access from Lincoln County Road D002 is available across state land (Section 2, T. 6 S., R. 9 E.) at the northwest end of Little Black Peak WSA. This legal access is temporary in that it is available only during established hunting seasons for protected game animals, and access rights are restricted to licensed hunters. Physical access to the WSA's across adjoining non-federal lands may be available at the discretion of adjoining land owners.

MAP I-1

Little Black Peak (060-109) and Carrizozo Lava Flow (060-110A-1) WSA's

Legend

WSA BOUNDARY

AMENDED BOUNDARY **(darker area excluded)**

Land Status*

BLM

P PRIVATE **(NONE)**

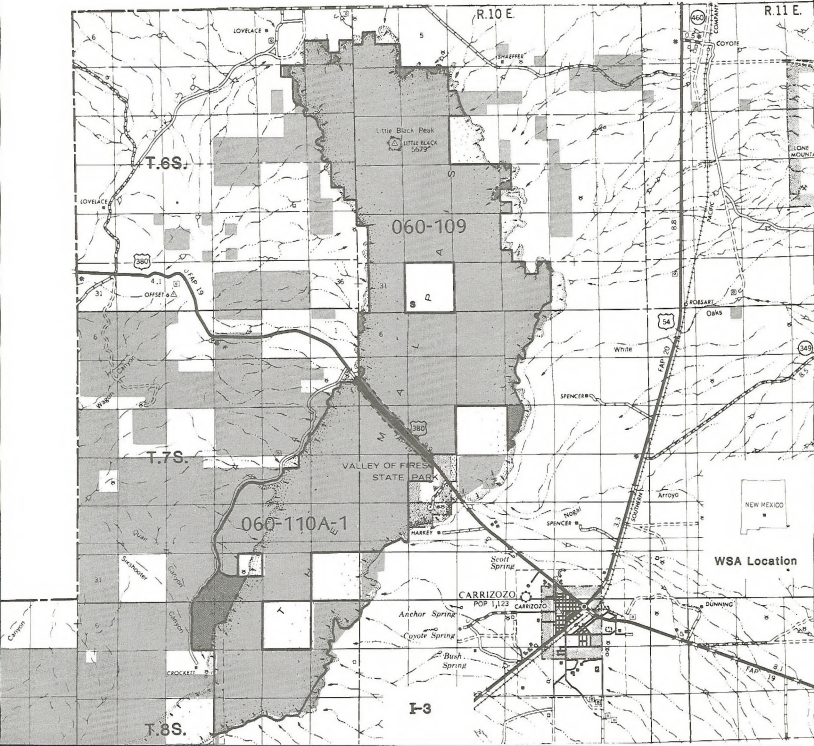
S STATE

N

Scale: 1/2 Inch=1 mile

* **Non-BLM ownership is identified only inside the WSA's boundary.**

Source: USDI BLM, Roswell District, 1982



II. EXISTING RESOURCES

A. Geology

1. Geologic Structure

The Carrizozo Malpais is believed to be one of the youngest lava flows in the continental United States and is estimated to be less than 1500 years old. This young age is indicated by the flow's fresh and uneroded appearance, and the extremely dark tone evident on high altitude satellite imagery. The lava flow in the WSA's was formed during two different volcanic episodes and both layers of lava can be detected in the area north of Little Black Peak and at a deep sinkhole in the southern WSA (Section 24, T. 7 S., R. 9 E.).

THIS 20 ACRE DEPRESSION IN THE CARRIZOZO LAVA FLOW WSA CONTAINS A DEEP SINKHOLE THAT CUTS THROUGH 160 FEET OF LAVA INTO THE UNDERLYING VALLEY FLOOR.

According to available information, the majority of the upper and most recent lava flow is included within the WSA's. The age of the Upper Carrizozo flow has not been established through any reliable method such as potassium-argon dating and age estimates are based on the fresh appearance of volcanic features.

The flow exhibits all the features commonly associated with recent flows of basaltic composition, such as flow units, pressure ridges, collapsed lava tunnels and "kipukas" (a Hawaiian term for older rocks surrounded as islands by lava). The upper surface of the flow is highly porous due to gas bubbles that escaped during the last stages of cooling. In places it is sufficiently spongelike in texture to be termed scoria. Of the two contrasting surface textures which develop on flows, the surface of this flow is commonly known by its traditional Hawaiian term "pahoehoe" (or ropy) which has a twisted and convoluted surface.

PAHOEHOE, A ROPY TEXTURED FORM OF LAVA, IS A COMMON FEATURE OF THE CARRIZOZO MALPAIS IN BOTH WSA'S.

The recent Pliocene age lava flow overlays older sedimentary rocks of the Permian age Yeso, San Andres, and Artesia Formations; Triassic age Chinle Formation ; and the Cretaceous age Dakota Sandstone and Mancos Shale Formations. All of the sedimentary formations have been tilted and appear at greater depths to the southeast. A small deposit of intrusive rock (molten rock that cooled below the surface) is exposed on the crest of the largest kipuka located at the southeast corner of Little Black Peak WSA.

2. Minerals

The primary source for mineral information used in this study report is from a document entitled "Geology, Energy and Mineral Resources Assessment in the Carrizozo Area, New Mexico". This document, referred to in abbreviated form as the GEM assessment, was contracted by BLM to supplement available information about mineral potentials in the WSA's. The GEM assessment may be inspected at the Roswell Resource Area office.

The GEM assessment indicated that, based on an analysis of existing information, there is no known mineral deposit or potential mineral occurrence in the WSA's that has more than a low favorability rating for development. Favorability ratings were based on an evaluation of the geologic environment, inferred geological processes and economic or technological constraints to resource development. The following mineral commodities and associated geologic environment were evaluated in the GEM assessment:

1. Replacement iron in intruded sedimentary rocks;
2. Hydrothermal gold, silver, copper, lead, zinc, fluorite, barite and porphyry molybdenum-copper in intrusive rocks;
3. Uranium in limestone and igneous rocks;
4. Stratabound copper-silver, and salt in the Yeso Formation;
5. Oil and gas in Paleozoic rocks;
6. Geothermal resources in volcanically active basalts;
7. Sand and gravel in alluvial deposits;
8. Gypsum in sedimentary formations;
9. Scoria, basalt and crushed rock sources.

There is no information that indicates any favorability for coal, vermiculite and placer gold to occur in the WSA's, even though these minerals are found in nearby areas.

B. Water

There are no perennial water sources in the WSA and surface water is only available for short periods following a heavy rainfall or sudden snow melt. When surface runoff does occur the water flows from the surrounding areas into the lava and infiltrates into the ground. Surface precipitation within the lava flow either evaporates or travels a short distance and infiltrates.

Ground water in the area adjacent to the lava flow occurs from approximately 90 to over 500 feet in depth. Due to high salinity the water quality is marginal for human consumption, but it is suitable for livestock and wildlife. Total dissolved solids in the ground water range from 1,000 to 3,000 mg/L.

Water usage in the WSA is low and most consumption is made by livestock and wildlife from available surface water.

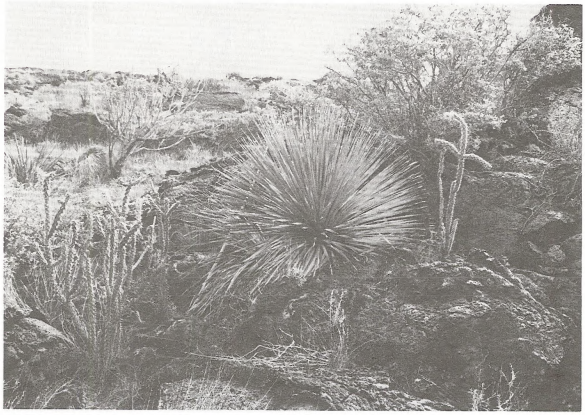
C. Soils

Six soil map units occur in the WSA area as mapped in the Lincoln County Area soil survey report. The majority of the WSA is shown as a lava flow map unit, which by definition is not considered a soil but is a land type describing the rocky lava flows. Some wind and water borne soil has been deposited in cracks and crevices in the lava which supports vegetative growth. Water and wind erosion hazards in the lava flow map unit are negligible.

The other five soil map units occur along the boundary of the lava flow and include the following soil series; Rance, Tanbark, Tortugas Andergeorge, Darvey, Asparas, Harvey and Gabaldon. These soils are not extensive within the WSA because the boundary closely follows the edge of the lava flow. Rance and Tanbark soils have a high wind erosion potential. Tortugas soil has a high water erosion hazard and a slight wind erosion potential. Andergeorge, Darvey, Asparas, Harvey and Gabaldon soils have a moderate water erosion hazard and a high wind erosion potential.

D. Vegetation - T & E Species

In comparison to surrounding areas the Carrizozo Malpais supports a remarkably diverse and luxuriant flora, 114 species exclusive of grasses compared to 51 species on the surrounding areas (Shields 1956).



ALTHOUGH THE CARRIZOZO MALPAIS IS BELIEVED TO BE A VERY RECENT VOLCANIC AREA, A DIVERSE COMMUNITY OF DESERT SHRUBS AND GRASSES HAS BECOME ESTABLISHED.

Both WSA's are within the Upper Sonoran Life Zone. Vegetation composition is primarily affected by a north-south elevation and precipitation gradient, with the north end being higher and wetter and, as a result, supporting a larger and denser tree and shrub community. Habitat type and aspect also influence vegetation composition within the lava flow.

No federal threatened or endangered plant species are known to occur in the area, as indicated by the U.S. Fish and Wildlife Service. One state plant of special concern (Rock Spleenwort Asplenium resiliens) is found within the Malpais. Habitat for this fern appears to be restricted to moist sinkholes.

Vegetative characteristics of the WSA's are summarized in the following table which indicates Standard Habitat Site classifications. Standard Habitat Sites (SHS) generally apply to broad areas with delineations based on similarities of vegetation and land form. This classification system is used for wildlife habitat management purposes.

Standard Habitat Site (SHS)	Approximate % Composition of WSA
Juniper-Mixed Shrub/Malpais	55
Mixed Shrub/Malpais	39
Grass-Mixed Shrub/Limestone Hills	6

Most of the Juniper-Mixed Shrub SHS is found in the northern WSA, starting about 1-1/2 miles north of U.S. 380. This SHS is indicated by the presence of a sparse overstory of one-seed juniper. The Mixed Shrub SHS occurs in both WSA's, but the majority of this site is within the southern WSA. The Grass-Mixed Shrub SHS borders the lower western side of the lava flow in the southern WSA.

E. Wildlife and Threatened or Endangered Species

Human visitation into the central portion of the WSA's is largely curtailed by the forbidding nature of the terrain, thus providing a haven for game animals. The difficulties presented in extracting killed game from the flow interior limits most hunters and trappers to hunting within a short distance from the perimeter. Repeated aerial reconnaissance flights have consistently shown that the predominance of big game sightings are within a quarter to a half mile from the periphery. This fact, when considered with the abundance of available browse, makes it apparent that the absence of water within the confines of the flow is probably the main limiting factor in game distribution.

The lava flow supports a sizeable herd of mule deer yearlong. In addition, a small band of barbary sheep has been observed during three seasons (summer, fall and winter) indicating yearlong residency. Predator species inhabiting or regularly visiting the flow include coyotes, kit foxes, gray foxes, bobcats, and ringtail cats. Historical sightings of mountain lions either passing through or staying for a time have been recorded. Also, reportedly, a black bear inhabited the flow until it was removed by hunters.

The diversity of bird species in the lava flow is high when compared to the adjacent grass uplands and limestone hills. Several woodland and scrubland birds inhabit the area yearlong or seasonally.

Included in this list are vireos, warblers, jays, sparrows, and shrikes. Turkey vultures along with great horned owls concentrate in the flow for breeding and nesting. During the winter months, both golden and bald eagles can be seen hunting over the lava or resting within. Heavy use by raptors (birds of prey) is evidenced by the sightings of numerous whitewashed crags and ledges visible from the air.

An unusual characteristic exhibited by some of the smaller animals inhabiting the lava flow is that they have developed a melanistic, or darker, fur or skin coloration than is typical for their species. This coloration is believed to be an effective protective mechanism that camouflages animals residing within the dark colored lava flow. The presence of melanistic animals was noted by biologists as early as 1927 and several new rodent subspecies were first collected in this lava flow during the 1930's. Additional details about research activities appear in Chapter III.F. of this report. There are twelve animal species - six rodents, five lizards and one snake - residing within the WSA that have developed melanistic races. Individuals within these races exhibit a high degree of variability in melanistic character ranging from near normal to very dark coloration. The white-throated wood rat is unique in that it has developed melanistic races in this area; melanistic races of this particular species are not known to occur on other lava flows in New Mexico.

The bald eagle, a Federally listed endangered species, has been observed near the periphery of the flow. The black hawk, listed as a State endangered (Group II) species, may occasionally occur in the vicinity of the flow although no sightings have been recorded. No delineations of crucial habitat in the WSA's for threatened or endangered wildlife species have been made by the U.S. Fish and Wildlife Service.

F. Visual Resources

Visual quality of the WSA's has been evaluated in accordance with BLM's Visual Resource Management (VRM) system, which is described in the Bureau's 8400 manual series. This two part system includes both the inventory of existing scenic qualities and the assignment of management goals that are needed to minimize visual impacts.

The Carrizozo Lava Flow, which includes both WSA's, was rated as high scenic quality when compared with other land areas in this physiographic region. Also, since this rating area is visible from a major travel route, user sensitivity to visual modifications was rated as high. The striking color contrast between black lava rock and the brown to gray surrounding landscape is the most important factor contributing to the high scenic value of this area. Inventory findings indicated the lava flow portion of the WSA's should be managed in accordance with VRM Class II goals. Portions of the WSA's outside the lava flow have lower scenic quality and management in accordance with less stringent VRM Class III goals is indicated.

G. Cultural Resources

The perimeter of the flow on both WSA's is characterized by grassy fingers or inlets which extend into the flow body. On a seasonal basis, water may be available along the edges in catchments and intermittent playas; however, no permanent springs, seeps, or other waters have been located within the WSA boundaries. The lack of permanent waters along with the ruggedness of the terrain may have prevented extensive human habitation other than occasional visits. Flakes, scrapers, broken points, and various tools were located along the periphery although such findings were infrequent and scarce. Caves, ledges, and protective overhangs examined for evidence of use uncovered no artifacts; however, local residents have indicated extensive pothunting occurred in past years.

Prior to the construction of Highway 380 which bisects the WSA's, the northern edge of the flow was utilized as a rest stop along the old stagecoach route. According to local residents, a well (probably a deep catchment) existed within the interior of the northern edge and was used to draw and haul water to the stage horses. The ruins of at least four abandoned homesteads or line shacks are located in the malpais, generally within a few hundred feet of the edge. Constructed of lava rock foundations, the ruins are in varying stages of deterioration. Roofing materials include both lumber and tin with nearby corrals constructed of posts and wire or lava rock walls. Associated dumps indicate the age of the ruins to vary from the late 1880's through the mid 1930's.

H. Air

No air quality data is available for this area. However, the air quality is considered to be good since there are no major sources of air pollution in the area. During windy periods, especially in the spring, there is a significant amount of wind-borne dust and soil in the air.

III. EXISTING AND POTENTIAL USES

A. Mineral Development

Leasable Minerals

Several sources of information were considered in order to determine the potential for development of oil and gas resources. The WSA's have been classified as prospectively valuable for oil and gas by the U.S. Minerals Management Service (MMS). An industry source, Atlantic Richfield Company, rated the northern WSA as having moderate favorability and the southern WSA as low favorability for oil and gas resources. Both WSA's have been rated as having low favorability in the GEM assessment based on indirect evidence. One well drilled on the western edge of Little Black Peak WSA encountered a show of oil in the San Andres Formation. Three exploration wells were located about one mile east of the lava flow and two are known to have shows of oil and gas. Two wells have been drilled several miles west of the lava flow - one well had a show of oil and gas while the other well was a dry hole. As of April 1982, 80% of federal oil and gas acreage in the WSA's had either been leased or applications were pending. The interest in leasing and the number of wells that contained shows of oil or gas serve to indicate that this portion of the Tularosa Basin has a potential for hydrocarbon resources. Whether or not there are any economic reserves of hydrocarbons underlying the WSA's is a question that can only be confirmed or denied through additional exploration.

All leases for federal minerals within the WSA's were processed after passage of the Federal Land Policy and Management Act (FLPMA) and lease operations are subject to regulation to protect wilderness values. A wilderness protection stipulation on these post-FLPMA leases seriously constrains potential exploration activities in rocky areas since allowable activities must be temporary and must be reclaimed to a substantially unnoticeable condition.

There is a low potential for other leasable mineral resources in the WSA, based upon indirect evidence. Salt is known to occur in the Yeso Formation. This formation is exposed in the southern WSA and a thick salt sequence was encountered in a nearby oil exploration hole. Potential development of this resource, if it is confirmed to exist in the southern WSA, would be limited since the reserves are probably covered by considerable amounts of overburden. Geothermal potential has been rated as low favorability based on indirect evidence - the presence of recent basalts. The MMS has not classified geothermal potential for the WSA's, nor have there been any leases or applications.

Locatable Minerals

Currently, there are no exploration or development activities for locatable minerals taking place in the WSA's. Twenty-two mining claims are currently located within the northern WSA on the large kipuka in Sections 9 and 10, T. 7 S., R. 10 E. During the summer of 1980 several exploratory holes were drilled on the claims but no information is available from these tests. Uranium claims had been located on the kipuka in the mid-1950's but have since been abandoned.

Due to the presence of an exposure of intrusive rocks in the northern WSA (the eastern part of the kipuka in Section 9 and 10, T. 7 S., R. 10 E.), this location has been rated as having a low potential for the accumulation of; hydrothermal gold, silver, copper, lead, porphyry molybdenum-copper and uranium. There is a low potential for stratabound copper-silver deposits in the Yeso Formation along the southwestern margin of the southern WSA. Uranium deposits in San Andres limestone along the western border of the lava flow and at the Tertiary intrusive are a low potential in both WSA's. There is a low potential for replacement deposits of iron to occur in both WSA's where sedimentary rocks have been intruded by igneous rocks. Magnetite has been found in similar situations in areas several miles north of the WSA's.

There is low favorability for the occurrence of hydrothermal fluorite and barite associated with the small Tertiary intrusive in the northern WSA. Gypsum is present in the Permian Yeso and San Andres Formations and subsurface deposits are known to occur on the western margin of both WSA's. Gypsum was mined from the San Andres Formation in the Jicarilla Mountains northeast of Little Black Peak WSA in the early 1900's, but production in the Jicarilla area ceased due to unfavorable economic conditions.

Salable Minerals

There currently are no active material sales within the WSA's, but scoria was sold from 1964 to 1972 at a location on the east side of Carrizozo Lava Flow WSA (Section 31, T. 7 S., R. 10 E.). This extraction site was excluded from the WSA boundary due to the substantially noticeable nature of the intrusion.

Scoria, basalt, sandstone and limestone from the WSA's could potentially be sold for landscaping and building material use, dependent upon local public demand or the availability of external market areas. This potential use is reduced by the availability of adequate supplies at nearby alternative source areas where materials are currently being extracted.

There is a low favorability for sand and gravel accumulations in about 300 acres of alluvial deposits in the southwestern corner of the southern WSA. Use of this potential resource would be limited by the distance to population centers and lack of legal access to potential deposits.

B. Watershed

The lava flow is in a stable erosion condition class due to its rocky nature which serves as an excellent water trap for surface precipitation and external drainages. The remaining soils which occur around the edges of the lava flow are in the slight erosion condition class. Due to the good watershed conditions, no management activities are proposed for the purpose of enhancing water resources.

C. Livestock Grazing

Cattle use occurs only on a small area within the boundaries of both WSA's. Appreciable use occurs only on the limestone hills and alluvial plain on the west side of the Carrizozo Lava Flow WSA, accessible kipukas and grassy inlets bordering the lava flow elsewhere. Livestock, with the exception of goats, are unable or refuse to travel any distance in the lava due to rugged terrain and lack of water sources. In the past, two livestock operators, the Crockett Ranch (now Schrecengost) and the Harkey ranch grazed goats in the lava. Both ranchers had to sell the goats when their herders quit and couldn't be replaced. Goats were last licensed on the Crockett Ranch in 1964 and federal land within the lava flow was removed from the allotment in 1965. Federal land in the former Harkey Ranch has not been included in a grazing allotment since 1965. All other ranchers indicated in 1965 that they had no desire to graze goats in the lava flow area, however, they retain their original grazing adjudication allowing them to change class of livestock from cattle to goats (Table III-1). This constitutes a potential grazing use in both WSA's. No range improvements have been proposed inside either WSA.

TABLE III-1: LIVESTOCK GRAZING IN THE CARRIZOZO LAVA FLOW AND LITTLE BLACK PEAK WSA'S

Name	Allot. Number	WSA	Acres in WSA	AUM's[a] in WSA Existing	Potential
Schrecengost	3076	CLF[b]	1429[c]	230	0
Carl Johnson	3077	LBP[d]	4412	e	508
Bar W Ranch	3080	LBP	2398	e	540
		CLF	1207	e	432
Gallacher Ranches	0367[f]	LBP	100	e	23

Source: Grazing case files.

a. An AUM (Animal Unit Month) is the amount of forage necessary for the sustenance of one cow or its equivalent for 1 month.
b. Carrizozo Lava Flow W.S.A.
c. Includes only land outside of lava flow but within W.S.A.
d. Little Black Peak W.S.A.
e. Not calculated
f. Gallacher Ranches is under administration of BLM Socorro District.

D. Recreation

Recreation resources in these units are quite diverse. Currently both areas are receiving increasing hunting pressure for deer and quail. The flow contains a moderate deer population (est. 3 per section); the area is popular because of stories of some extremely large deer being taken in the flow. The recent discovery of a small herd of Barbary sheep in the flow will probably add to this area's popularity.

The unique plant, animal and geological features found at the flow attract many visitors each year. There is no visitor use data for either of the two WSA's, but information is available for Valley of the Fires State Park located between the WSA's. A five-year average visitation at Valley of the Fires State Park is 48,000, but has been known to reach over 75,000 visits in a single year. This park, with its campground, toilets, etc., is an excellent place for visitors to set up camp and visit the surrounding lava fields within the two study areas. This park also has a "Malpais Nature Trail" which explains the flora, fauna and geologic features of this unique lava flow.

Other recreational uses in the lava flow are hiking, bird watching, nature study and spelunking. Hikers and weekend naturalists find the lava field interesting because of the availability of diverse plant and animal communities, visual attractiveness and challenging terrain with sinkholes and caves. The majority of the visitors park along Highway 380 and walk into the study areas.

The potential use of this area has never been realized primarily because of a lack of adequate access, limited parking space next to Highway 380 and widespread lack of knowledge of the area by the public. Rights-of-way for the public on private roads could provide better recreation access. Future plans for Highway 380 involve enlarging the roadway. Construction on this highway would present the opportunity to construct more pullouts and increase recreational use. Valley of the Fires State Park is helping to make the public aware of the flow and its recreation potential.

E. Education/Research

The Carrizozo Malpais has been an important locale for scientific study by biologists, botanists and geologists since the late 1920's and some research activities are taking place at the present time.

Early biological explorers first described flora and fauna of the lava flow in connection with more extensive surveys in the Tularosa Basin. The reported presence of melanistic (dark colored) races of small animals sparked the interest of other researchers in this particular lava flow. Scientists on an expedition sponsored by the University of Michigan in 1927 reported the discovery of a very light-colored pocket mouse at White Sands and a dark-colored pocket mouse in the nearby lava beds (Dice 1930). The relationship between animal and habitat coloration was believed to be the result of isolation and natural selection, but no

conclusive evidence was obtained to confirm or deny this theory (Benson 1933). L. M. Shields (1956; 1957) described vegetation of the lava flow and conducted studies concerning the role of lichens and algae in nitrogen formation in volcanic soils. Dr. S. E. Reichert of the University of Tennessee is presently conducting a behavioral and energetics study on a species of spider that inhabits the flow (Personal Communication 1982). Geologists have analyzed the mineral composition of the lava and studied flow formation processes.

Geological guidebooks with descriptions of the lava flow are available to provide an educational opportunity for visitors. The "Malpais Nature Trail" at Valley of Fires State Park provides an educational experience for park visitors and students from nearby schools. In addition to existing educational uses, information gained from scientific studies may enhance future educational values of the WSA's.

F. Realty Actions

There are no existing rights-of-way, withdrawals, easements or permits on public lands within the boundaries of either WSA; the WSA boundaries are located 50 feet on either side of the U.S. Highway 380 centerline.

The only known potential realty action in the WSA's would be in the immediate vicinity of the U.S. Highway 380 corridor. The New Mexico State Highway Engineer has indicated that the lava flow segment of U.S. 380 needs reconstruction and a right-of-way should be acquired. Long-term potential needs for highway purposes in this area are estimated to affect no more than a 300 foot wide corridor of public lands.

G. Military Use of Airspace

The United States Air Force currently uses airspace either directly above or in the immediate vicinity of both WSA's for airborne tactical training maneuvers. This use normally consists of flights at elevations below 10,000 feet at speeds in excess of 250 knots. Some high speed flights occur at 500 to 1500 feet above ground level.

At the time this report was prepared there were parts of three military training routes and one restricted area overlying the WSA's. However, training routes are periodically modified or deleted to introduce route variation and prevent pilots from memorizing a particular course of travel. It is possible that at different times airspace above the WSA's may not be within any training route.

The Air Force has indicated that continued use of airspace above the WSA's is essential to their operational and training missions.

IV. WILDERNESS CRITERIA

A. Evaluation of Wilderness Values

1. Quality of Mandatory Wilderness Characteristics

a. Naturalness

The imprint of man's work is very limited within the boundary of both WSA's. Two major factors which contribute to the generally natural appearance of these WSA's are: (1) the lack of exploitable resources and presence of rugged terrain within the lava flow has prevented most of man's activities; and (2) areas containing significant manmade intrusions were excluded from the study area boundaries during the inventory process.

Imprints of man that are known to be within the current boundaries for both WSA's are described as follows and depicted on the accompanying map:

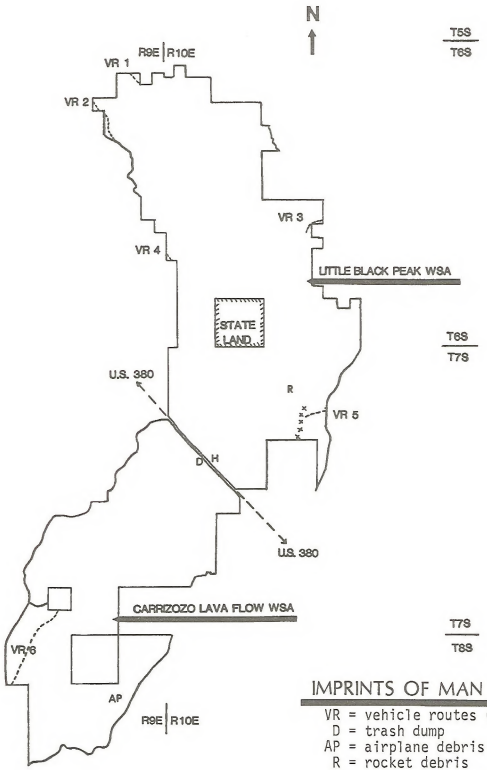
(1) Vehicle Routes - There are portions of six low-standard motorized vehicle access routes within the WSA's boundaries, with most routes paralleling the edge of the lava flow. One vehicle route provides access across less than 1/4 mile of lava to the kipuka in Section 9, T. 7 S., R. 10 E.

(2) U.S. 380 Travel Influence Zone - There is an unauthorized trash dump, scattered roadside litter and some painted graffiti on lava rocks that border U.S. Highway 380. Some of these minor imprints are within the study areas since the edge of the highway right-of-way is the north or south boundary for both WSA's. One abandoned homestead in the Little Black Peak WSA is within this travel zone.

(3) Mineral Exploration - There are 5 prospect trenches, some of which are 40' long by 20' wide by 8' deep, on the kipuka in Section 9, T. 7S., R. 10E. These trenches are noticeable within the kipuka but natural vegetation has reduced their offsite noticeability to some extent. Recent exploratory drill holes on the kipuka are substantially unnoticeable.

(4) Miscellaneous Imprints - In the southern WSA there are the tail section and debris from a wrecked airplane, and the debris from a wrecked rocket or missile is in the northern WSA.

The individual and cumulative effect of human imprints within the WSA's has not significantly impaired their natural character. The minor imprints that are present near the lava flow edge are easily removed from view by traveling a short distance inside the lava which has excellent topographic screening qualities. Due to the location of these imprints near the WSA's external boundaries, it would be possible to exclude imprinted areas from a wilderness recommendation. The screening effects of topography also minimize the influence of outside sights and sounds of highway traffic upon the naturalness characteristic.



IMPRINTS OF MAN IN WSA's :

VR = vehicle routes (1 through 6)
D = trash dump
AP = airplane debris
R = rocket debris
H = abandoned homestead
X = mineral prospect pits

SCALE; one-half inch = one mile

The apparent high quality naturalness of these WSA's would be readily perceived by the average visitor. In fact, the naturalness of the relatively undisturbed ecosystem inside the lava flow is one of the distinguishing wilderness qualities for both WSA's. Evidences of man are so dispersed and limited that an average visitor would be led to believe they were the first human to set foot on or observe most areas in the lava flow.

b. Solitude

The rough and broken surface of the lava flow provides an outstanding opportunity for visitors to find solitude. Topographic features such as pressure ridges, fissures and depressions allow visitors to be screened from one another and from impacts outside the area such as vehicles on U.S. Highway 380. The relatively large size and generally desirable configuration of both WSA's and the presence of a scattered overstory of juniper trees, which are more abundant in the northern WSA, also enhance solitude. Other factors that contribute to solitude opportunities in the WSA's consist of limited legal accessibility for the general public, the lack of water sources needed to support unconfined recreation and low levels of visitor use. These factors are expected to influence solitude opportunities in the WSA's during the foreseeable future.

Portions of the WSA's outside the lava flow do not provide as high a quality setting for solitude. This reduced quality is especially noticeable in the alluvial plains on the southwestern edge of the southern WSA which lack topographic and vegetation screening. An intermittently occupied dwelling on private land borders this portion of the WSA.

The sound of vehicles on U.S. Highway 380 would detract, in varying degrees, from solitude on WSA lands bordering this travel route. Noise impacts would vary according to the proximity of visitors to the highway and upon the availability of screening topography that would reduce noise levels. This localized impact is not expected to diminish the solitude that is characteristic of the WSA's since users would still be able to find a secluded spot. High noise levels generated by low flying military aircraft that use airspace above the WSA's for training missions would intermittently diminish solitude opportunities. Visitors would not be able to avoid this short duration and infrequent noise impact. However, this activity is not considered to be a barrier to wilderness designation since there are designated wilderness areas that are subject to similar uses.

The undesirable configuration of a narrow peninsula of WSA land in Section 15, T. 7 S., R. 10 E. does not contribute to an outstanding opportunity for solitude. This portion of the WSA varies from about 100 feet to 1600 feet wide, and is bordered by state and private land on three sides. Visitors would have difficulty in finding a secluded spot within this portion of the WSA.

Although there are some factors that detract from solitude opportunities in the WSA's, their cumulative impact is not considered as being great. The overall quality of this wilderness characteristic is rated as high.

c. Recreation

Opportunities for primitive and unconfined types of recreation in the WSA's consist of hunting, hiking, nature study, spelunking, photography and dispersed sightseeing activities that focus on cultural, geological, botanical and zoological resources. The intricately broken surface of the lava flow portion of the WSA's is an effective barrier to motorized vehicle use. This physical quality enhances opportunities for primitive recreation experiences.

The unavailability of water sources inside the WSA's and poorly distributed legal access routes limits the potential for dispersed recreation uses. Visitor activities would be confined to the range that carried water supplies would permit a person to travel. Therefore, opportunities for dispersed use are greatest in the central portion of the WSA's and most limited at the northern and southern ends. The absence of a multitude of landforms, well defined travel routes and points of interest in the WSA's may detract from some people's perception of recreation qualities. People that expect those qualities in a wilderness area would not be intrigued by the opportunities these WSA's offer.

Overall, the quality of recreation opportunities in both WSA's is rated as moderate.

2. Special Features

The diversity of vegetation, presence of melanistic forms of wildlife, availability of unusual geological features such as caves and volcanic landforms, and the scenic qualities of the recent lava flow constitute the special features of this WSA.

3. Multiple Resource Benefits

Resource values and uses in the WSA's that would be perpetuated through wilderness designation and protective management include wildlife habitat and associated species, cultural values, watershed, nonmotorized recreational activities and scenic values.

Congressional designation as wilderness would carry the weight of law and would provide a greater degree of long term protection for natural values than would the administrative designations available to the Bureau.

A more detailed discussion of multiple resource benefits that would be afforded by wilderness designation appears in the impact analysis for the all wilderness alternative in Chapter VI.A. of this report.

4. Diversity

a. Ecosystems Present

Use of the Bailey-Kuchler classification system has been selected by BLM to ensure nationwide consistency in evaluating this diversity criteria. According to the Bailey-Kuchler system, both WSA's are located within the Colorado Plateau Province and have Juniper-pinyon woodland potential natural vegetation.

b. Distance To Population Centers

The WSA's are within 5 hours driving time from the following Standard Metropolitan Statistical Areas - Albuquerque, New Mexico and both El Paso and Lubbock in Texas.

B. Manageability

In order for the WSA's to be recommended as suitable for wilderness designation they must be capable of being managed over the long run to preserve wilderness character. Manageability of an area is determined based upon an evaluation of provisions contained in BLM's Wilderness Management Policy (WMP). The following manageability factors were determined to potentially affect the ability of the BLM to preserve wilderness character: topography, State inholdings, mining claims and a potential realty action.

A small portion of the WSA's that lacks a lava rock surface has gentler topography and is susceptible to activities such as motorized vehicle use which could conflict with wilderness management. Areas with gentle terrain are found in grassy coves and surrounding plains on the northern boundary of Little Black Peak WSA, and the alluvial plains/limestone hills in the southwestern part of Carrizozo Lava Flow WSA. There are no natural barriers to prevent conflicting uses on the alluvial plains near Crockett's Ranch, and non-conforming activities could occur in drainages within the limestone hills. Manageability of lands that lack natural barriers to exclude incompatible uses is further complicated by the remote location and limited accessibility of those portions of the WSA's. The WSA's are located near the periphery of the BLM administrative boundary, about two hours driving time from the managing office, and therefore are not as easy to inspect as closer areas. Although the lack of legal access to the northern and southern ends of the WSA's has not presented a manageability problem, future problems could arise if access for management purposes is denied in those areas.

The State inholding in Little Black Peak WSA (Section 32, T. 6 S., R. 10 E.) is potentially subject to exploration for oil and gas resources because this land has been leased. It is probable that potential use of State lands would occur prior to the lease expiration date in June 1991. Exploration activities are more likely to occur on State lands since there are no restrictions to protect wilderness values, as is the case on surrounding federal lands. Although it is difficult to

predict what exploration method would take place, it is assumed that in the most extreme case, road access would be needed across WSA lands in Section 31, T. 6 S., R. 10 E. A road within that section would cause localized impacts to wilderness values but would not significantly affect manageability of the surrounding WSA.

Two State sections are located on the east boundary of the Carrizozo Lava Flow WSA. Section 36, T. 7 S., R. 9 E., has been leased for oil and gas development while Section 2, T. 8 S., R. 9 E. is open for leasing. At the present time road access could be provided to Section 36 across federal lands that are outside of the WSA in Section 31, T. 7 S., R. 10 E. However, if road access is ever needed to Section 2, the shortest route would be across WSA lands in Section 1, T. 8 S., R. 9 E. Depending upon the construction methods, routing and type of materials used for a road, this non-conforming use would have a localized effect but would not significantly affect manageability of the surrounding WSA.

The twenty-two mining claims in Sections 9 and 10, T. 7 S., R. 10 E., which were located in March 1978, are subject to management to prevent impairment of wilderness values. At the present time it is not known if a valid discovery of economically recoverable minerals has been found on these claims. However, based on the generally low favorability for locatable minerals it is doubtful that a discovery has been made. In the event that discovery and patent requirements are met on all of these claims, it would be possible to exclude that area from a wilderness recommendation since it is on the periphery of the WSA.

Based on existing information the BLM is not reasonably certain that development of mineral leases on State lands will occur or a valid discovery will be made on existing mining claims in the WSA which would necessitate changes to improve manageability of the WSA's. Also, since these potential manageability conflicts would have localized effects on wilderness character and since similar nonconforming activities are allowed by the 1964 Wilderness Act in designated wilderness areas, boundary modifications are not needed.

The potential right-of-way expansion and reconstruction work on U.S. Highway 380, in addition to the concentrated imprints of man along this travel route, impairs wilderness manageability in contiguous portions of both WSA's. Present and potential activities are reasonably certain to destroy wilderness character in the affected area, but a boundary adjustment could prevent manageability problems.

Manageability of the WSA's as wilderness would be enhanced through acquisition of one State inholding in Little Black Peak WSA and other unimpaired lands within the lava flow that border both WSA's. This potential enhancement measure, conducted through a voluntary exchange or purchase program, would be conducted with the goal of acquiring non-federal lands that would form valuable additions to a designated wilderness. If the WSA's are designated as wilderness, a land consolidation program would reduce problems associated with providing adequate access to inholdings and would allow for consistent management of the lava flow landform. Irregular ownership patterns along the edge of the lava would be improved and a wilderness boundary that coincides with a recognizable landform could result.

V. PUBLIC INVOLVEMENT OVERVIEW

This report was prepared after considering information and comments provided by the public. Public views concerning BLM's wilderness recommendation for these WSA's will continue to be requested and considered during later stages of the wilderness study process.

Public comments regarding the identification and selection of these areas for wilderness study were requested in 1979 and 1980 during the inventory phase of BLM's wilderness review program. However, unsolicited public interest in this area was expressed prior to the start of inventory work. A comment in a nationally distributed 1978 magazine article recommended the Carrizozo Malpais as a candidate for wilderness designation since it was notable as one of the most recent lava flows in the western United States.

During the public comment period on wilderness study area proposals, individual comments and petitions concerning both WSA's were received by BLM. Most of the individual comments and all petitions favored wilderness study for these areas. Most people indicated that wilderness characteristics were present, although some people did not offer supporting reasons for their recommendation. Comments opposing wilderness study cited as supporting reasons: the presence of range, road and mining impacts; noise impacts from traffic on nearby highways and aircraft overhead; and potential problems with access to state land.

Public comments that have been received since completion of the inventory phase described existing and potential resource uses. One comment opposed wilderness designation due to mineral resource conflicts. Local, state and federal agencies have been requested to identify problems that wilderness designation would have with their plans, policies or regulations. The only concerns identified were surrounded state trust land, highway use and military training use of airspace.

VI. ALTERNATIVES AND IMPACTS

There would be no significant effects under any of the management alternatives considered in this report to the following resources and uses in both WSA's; geology, water, soils, air, existing livestock grazing, existing rights-of-way and airspace use. For this reason, no impact analysis is presented in subsequent parts of this chapter on these subjects.

A. All Wilderness

Under this alternative, the entire 25,312 acres of public lands in both WSA's would be recommended as suitable for wilderness designation.

1. Impacts to Minerals

It is assumed that all mineral resources would be withdrawn from appropriation, and Congress would not establish special provisions for mineral exploration or development within the designated wilderness.

There is no existing use of known mineral resources in both WSA's, but potential uses could be affected by wilderness designation. Salable minerals - namely scoria basalt and suitable materials for crushed rock, would not be available for use. However, there are alternate sources in the immediate vicinity of the WSA's where demands for salable minerals could be met. Future demands for these construction materials are not expected to change appreciably from the current situation because resources are not close to a large population center and large-scale construction projects are not anticipated. Unavailability of salable minerals would be a minor long-term impact. Impure deposits of gypsum that would be excluded from development would be slightly impacted under this alternative since other factors, such as mineral purity and inaccessibility, have a greater influence upon potential use of this mineral.

The extent of other mineral values in the WSA's is not completely known, which makes it difficult to predict actual impacts. It is assumed that wilderness designation would have a slight effect upon use of other minerals since there is a low favorability for their development in the WSA's, as pointed out in the GEM assessment. Most mineral commodities, with the exception of oil and gas, could be found only in small portions of the WSA's, such as intrusive or sedimentary rocks. Since these minerals are only inferred to be present in the WSA's and no discoveries have been made, wilderness designation would preclude exploration under the mining and mineral leasing laws to determine if resources actually exist.

Based on existing information, wilderness designation would have a low degree of conflict with mineral resource development.

2. Impacts to Other Resources and Uses

a. Vegetation

Potential impacts to vegetation under this alternative would be reduced because surface disturbing activities such as oil and gas exploration and mining would be prevented. Potential grazing activities would be conducted in a manner that would protect wilderness values such as naturally-appearing vegetation and wildlife habitat. Due to the ruggedness of the Malpais, existing grazing use affects a small area and oil and gas exploration in the area has not shown promise, therefore, vegetation would remain much the same as it is now.

b. Wildlife

Potential impacts to wildlife habitat due to actions such as road building or scoria removal would be avoided. Wildlife improvements would be limited to actions consistent with preserving the wilderness integrity. Hunting, trapping, birdwatching, and similar wildlife-related activities would be expected to remain at about the same level.

c. Visual

Maximum protection of visual resources in the WSA's would occur under this alternative since all public lands would be managed to preserve their natural character (VRM Class I). Management activities would be limited to those actions which do not attract attention. Scenic qualities of the lava flow landform and bordering areas would not be completely protected by this alternative since incompatible activities could still take place on non-federal lands. There would be on-site visual degradation of federal lands if access roads are constructed to state lands inside the lava flow.

d. Cultural

Limited opportunities for surface disturbance under wilderness designation would provide maximum protection for cultural and historical resources. Increased visitation which could result from the attention created by wilderness designation could result in more human disturbance of cultural values.

e. Livestock Grazing

Potential use by goats of presently ungrazed areas would be managed to prevent conflicts with wilderness values, such as plant communities and wildlife habitat. Range improvements, if needed, would be constructed only for improved management of livestock or for resource protection, and not for the purpose of increasing herd sizes.

f. Recreation

The all wilderness alternative would have little impact on recreation activities in both areas. The lava flow blocks vehicular access, so ORV use would not be affected. Increased attention due to wilderness designation may increase ongoing recreation use.

g. Education/Research

The all wilderness alternative would provide protection, from adverse actions which may impact some of the natural systems related to the flow. The lava flow ecosystem is the highpoint of educational and research pursuits in this area.

h. Realty Actions

Potential expansion in the width of U.S. Highway 380 would be precluded by this alternative. The highway right-of-way would remain at 100 feet wide and future activities would be confined to that corridor.

i. Wilderness Values

Wilderness designation would provide for long-term protection of wilderness values on all lands inside the WSA's, as mandated by Congress. Existing imprints of man would be rehabilitated to substantially unnoticeable conditions and vehicle routes would be closed to motorized use.

Manageability problems, identified in Chapter IV.B., would not be remedied and more administrative work would be needed to ensure protection of the designated wilderness.

Reasonable access to state lands and activities on mining claims on federal lands would be allowed, but regulated to minimize impacts to wilderness values. Valid mining claims located prior to wilderness designation could be patented, but surface rights would not be conveyed to the claimant. BLM could regulate surface uses on patented mining claims, to minimize impacts to the wilderness resource, and surface uses that were not reasonably required for mining operations would not be allowed.

B. Amended Boundary

Under this alternative, boundary adjustments would exclude approximately 1,063 acres from a wilderness recommendation. Boundary adjustments would remove lands with lower quality wilderness characteristics and enhance manageability of the remaining area. Boundary adjustments consist of removing relatively flat and open terrain bordering the lava flow, a narrow finger of lava bordered by non-public lands, and WSA lands paralleling U.S. Highway 380. The amended boundary alternative is depicted on Map 1.

This alternative would not cause a significant impact to potential realty actions. For this reason, this resource use is not mentioned in the following impact discussions.

1. Impacts to Minerals

Impacts would be similiar to those described for the all wilderness alternative except that a small area in the southwest corner of the WSA's would be available for mineral exploration and development. About 590 acres of alluvial plains and Yeso Formation, which has a geological environment where several mineral resources could be found, would be open to mineral activities under this alternative. Other boundary adjustments, along the edge of the lava flow, would allow for mineral exploration to occur on land that would be protected in the all wilderness alternative.

2. Impacts to Other Resources and Uses

a. Vegetation, Livestock Grazing and Education/Research

Impacts would be similar to those described for the all wilderness alternative.

b. Wildlife

Impacts to wildlife under this alternative could result from potential habitat loss in non-wilderness portions of the WSA's due to surface disturbing activities. It is assumed that fencing of the U.S. Highway 380 right-of-way, which is required by State policy, would occur under this alternative. Construction of a highway fence along the amended boundary could affect movement of the resident mule deer and barbary sheep herds. With proper mitigating measures (underpasses, etc.), which BLM could require as a condition of the right-of-way grant, this impact could be reduced to a minor level over the long-term or eliminated by not allowing fence construction.

c. Visual

Visual resources on lands within the amended boundary would be protected under this alternative. Portions of the WSA's that have the highest scenic quality would be protected through this alternative. All other impacts would be similar to those discussed in the all wilderness alternative, except that visual qualities could be slightly degraded in a small area bordering Highway 380. It is assumed that reconstruction of Highway 380 would not cause a significant change in scenic qualities since impact mitigation measures that minimize the extent of visual impacts would be employed.

d. Cultural

Potential damage to known and undiscovered cultural sites could occur due to ORV or vehicular travel around the perimeter of

the flow. Vandalism to historical sites could increase with additional visitation around the edge of the lava flow.

e. Recreation

The impact to recreation activities would be similar to the all wilderness alternative with one exception; the amended boundary along Highway 380 would allow for upgrading of the roadway. Highway improvement with pullouts could provide for additional parking which would increase roadside visitation in both areas.

f. Wilderness Values

Under this alternative, wilderness values in the most manageable part of the WSA would be protected through long-term Congressional designation. Management of WSA lands excluded under this alternative would be subject to administrative change and non-wilderness activities could be allowed on lands that are contiguous with a wilderness boundary. However, the rugged topography inside the designated wilderness would prevent further encroachment of nonconforming uses, and external impacts would not have a significant effect upon nearby wilderness values. All other impacts are similar to those described for the all wilderness alternative.

C. No Action

This alternative describes the impacts to wilderness values and other resources that would occur if the WSA's are not designated as wilderness and existing resource uses are continued. The only constraints that would apply to resource utilization would be physical and economic limitations. There would be no special form of management to conserve or protect resource values except for actions mandated by law, policy, rule or regulation. Future surface disturbing activities, such as material sales and exploration on mineral leases, would probably be confined to the periphery of the lava flow as they have in the past. The rugged terrain in this landform would continue to present a natural barrier to most uses.

This alternative would not affect potential livestock grazing and cause a significant impact to realty actions. For this reason, there is no impact discussion in the following analysis.

1. Impacts to Wilderness Values

Under the no action alternative there would be no long-term special protection accorded to wilderness values.

Material sales and mineral exploration along the periphery of the lava flow would cause localized degradation of wilderness values. The additional cost of construction for exploration in this rugged terrain would minimize the extent of future impacts. During the foreseeable future, wilderness values in the central part of the lava flow are

expected to remain unaffected by man's activities because of the protective topography. Wilderness values in less rugged portions of the WSA's are more susceptible to change and could potentially be lost due to the impact of future land alterations.

Nonconforming uses (access to state lands and development of mining claims) would be regulated only to prevent unnecessary and undue degredation of federal lands. Impacts to wilderness values would not be considered when allowing these uses and there would be a greater effect upon the wilderness resource under this alternative. Also, patents that include both surface and mineral rights could be issued on valid mining claims; wilderness resources would be lost on developed areas and solitude could be degraded on adjacent areas.

2. Impacts to Other Resources and Uses

a. Mineral Development

Mineral impacts would be similar to the first two alternatives except that wilderness protection would not have an influence on resource development. Under this alternative mineral leasing, location and sales activities would not be restricted or regulated in order to protect wilderness values. It is assumed that although mineral exploration or development would be allowed under this alternative, there would be a gradual long-term increase in use that would be moderated by physical and economic limitations.

b. Vegetation

This alternative would allow for potential degradation of the vegetative resource. Surface disturbing activities and potential livestock grazing could destroy or alter the natural vegetation since there would be no special protection for this wilderness resource. Livestock grazing could reduce the diversity and density of plant species. Vegetation would be eradicated in areas where material sales occur. Access routes for oil and gas exploration would open more areas to cattle use and consequently affect vegetation.

c. Wildlife

Impacts under this alternative would be similar to the amended boundary alternative except that a gradual long-term increase in surface disturbing activities could occur. This would create a moderate impact during periods of actual disturbance and a minor impact in the long-term.

d. Visual

Visual resources would be managed under less stringent VRM Class II and III goals. Modifications that could be seen but would not attract attention would be allowed in Class II areas, which would include the lava flow landform. Alluvial plains, limestone hills and

grassland bordering the lava would be managed as Class III areas. Modifications that begin to attract attention could be allowed in Class III areas under this alternative. Future visual modifications would probably take place on the periphery of the lava flow as they have in the past. The rugged topography in the central part of the flow would preclude most impairing activities and visual qualities in that area would be maintained during the foreseeable future.

Administrative protection of visual resources would not be assured under this alternative since BLM managers would have the prerogative to downgrade VRM goals or allow activities to occur that would be inconsistent with more stringent goals.

e. Cultural

Cultural resource impacts would be similar to those described for the amended boundary alternative, except that more vandalism could occur since less management attention would be devoted to this land area.

f. Recreation

Present recreation activities would continue, but may be impaired or destroyed in areas where mineral exploration or production takes place. This impact is not expected to affect primitive recreation opportunities in the majority of the area.

g. Education/Research

Disturbances to natural vegetation, which could potentially happen under this alternative, would affect associated education and research values. This alternative is not believed to present a significant impact to zoological research activities.

VII. RECOMMENDED ACTION

A. Recommended Action Description

The recommended action for Little Black Peak and Carrizozo Lava Flow WSA's is the Amended Boundary alternative. A total of 24,249 acres of the WSA's are recommended as suitable and 1,063 acres are recommended as nonsuitable for wilderness designation.

B. Rationale

This alternative was selected since it would result in a more readily identifiable wilderness boundary that conforms with a topographic feature, and conflicts with other resource uses would be minimized. Lands with the highest quality wilderness values would be protected and lower quality areas that have been impacted by man's activities would be excluded from the recommended wilderness.

Identifiability of a wilderness boundary, naturalness and manageability would be improved by excluding lands that have gentle terrain, located ouside the lava flow, from the wilderness recommendation. These adjustments affect 324 acres in small parcels on the north, east and west sides of Little Black Peak WSA and 590 acres at the southwestern corner of Carrizozo Lava Flow WSA. Most vehicle routes inside the WSA's would be eliminated and conflicts with vehicle use would be greatly reduced. The natural barrier presented by the lava flow would preclude most other activities that are incompatible with wilderness preservation.

Wilderness boundaries would be pulled back to 150 feet on either side of the centerline of U.S. Highway 380 to exclude manmade intrusions and prevent future conflicts with highway expansion. This adjustment would remove about 54 acres from the WSA boundaries.

Solitude opportunities would be improved by the previously described boundary amendments and by removal of a narrow finger of lava flow, 95 acres, on the southwest corner of Little Black Peak WSA. This section of the WSA has an awkward configuration and could be impacted by potential uses on contiguous non-federal lands.

The cumulative impact of proposed boundary adjustments would not significantly affect wilderness values in the remaining area.

Based on existing information and analysis reflected in this report, the area included in the recommended action is more suitable for wilderness designation than for other uses.

C. Consistency With Other Plans

The recommended action for Little Black Peak WSA is consistent with BLM's 1971 land use decision that called for designation of the lava flow north of U.S. 380 as a wildlife primitive area. The recommendation for Carrizozo Lava Flow does not conflict with other BLM land use decisions.

No conflicts with the policies and plans of other local, state or federal government agencies have been identified. Continuing coordination and consultation with other agencies will take place during subsequent portions of the wilderness study process in New Mexico.

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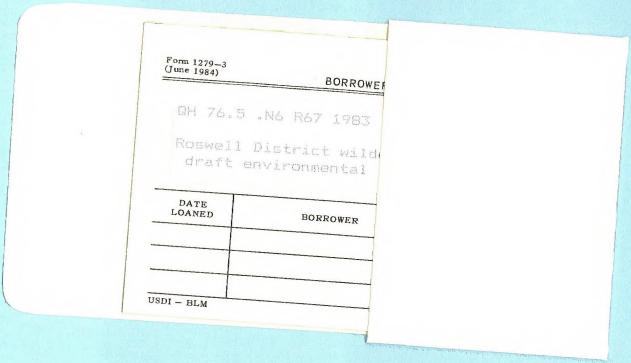
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